

# AMERICAN ARTISAN

MAY  
1940



RESIDENTIAL AIR CONDITIONING  
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED  
1880

**LAMNECK**  
*Series 700 System*  
**PREFABRICATED DUCT  
 AND FITTINGS**

**It's the  
 Method of  
 TOMORROW**

*because...*

***It Pays Profits  
 TODAY!***

● There's little doubt but that every day Prefabricated Duct and Fittings are becoming as widely accepted for residence heating and air conditioning as are factory-made furnace pipe and fittings by the gravity warm air heating industry.

The reasons are obvious. Lamneck Series 700 System offers savings *right now* which were unheard of a few years ago. It offers a complete and flexible line of fittings, adaptable to all residence installations. With the Lamneck method you know before you submit your bid exactly what the material cost will be. You can determine almost to a penny what your labor costs will run, because the Lamneck System reduces assembly time to a matter of seconds and installation to a matter of split minutes.

Prefabricated Duct and Fittings actually creates *new* demands for labor among

skilled sheet metal workers. It permits better and more efficient installations at less cost, removing the residence forced air heating and air conditioning job from the luxury class and putting it into a position of tremendous future possibilities. It makes this type of installation available to every home builder.

To you who are vitally interested in residential work, LAMNECK Series 700 System offers an amazing opportunity for profit and growth. Through Predetermined Engineering it guarantees to both you and your customer a perfectly balanced complete installation. Through PREFABRICATION you reduce your material cost—labor cost—installation cost. In every step of the way, savings are given back to you for either EXTRA profit or competitive advantage! Investigate the superior LAMNECK Series 700 System NOW!

*Specify*

After you write for the name of your nearest distributor, sit down and talk with him. You can rely on his sound advice and judgment.



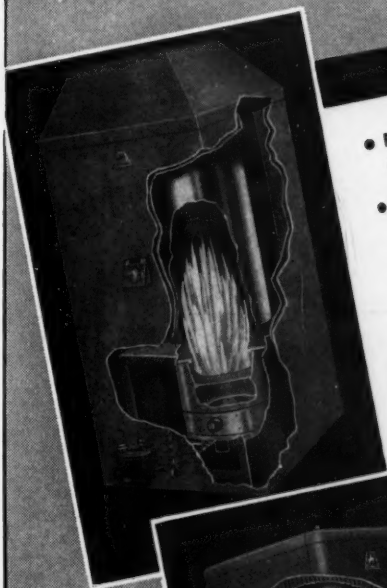
**LAMNECK**

*Prefabricated Duct and Fittings for  
 All Types of Residential Warm Air  
 Heating and Air Conditioning Systems*

**LAMNECK PRODUCTS, Inc.**

416-436 Dublin Ave., Columbus, Ohio





## MODEL 80 G

- Fully automatic oil burning furnace with 65,000 B.T.U. output at register.
- Full size radiator or heat economizer giving additional heating surface and reducing stack temperature to a minimum.
- Combustion Chamber of heavy gauge boiler plate steel.
- Lochinvar Multiple-Stage burner.
- Heavy 20-gauge furniture steel casing.



## MODEL 80

- Fully automatic oil burning winter air conditioning furnace with 72,000 B.T.U. output at register.
- Same burner and quality construction as Model 80 G.
- Split phase motor, for twin blower.
- 3 speed twin blower, noiseless in operation.
- Access door to blower, motor and filters. By removing door, blower and motor assembly can be easily pulled out as shown in illustration.

**EVERY  
SMALL HOME  
BUILDER WILL  
OKAY THESE  
FURNACES**



All Lochinvar units are listed as standard by Underwriter's Laboratories.

These Lochinvar automatic oil burning furnaces were designed and priced for furnace dealers who want to realize additional profits in that fast growing market of small home builders. The Lochinvar engineers have built into both the Model 80 G and Model 80 the same quality construction and economy of operation that is found in furnaces designed for houses costing three to four times as much. The Model 80 G is a gravity warm air furnace giving automatic oil heat at any temperature desired, while the Model 80 is a complete winter air conditioning unit giving automatic oil heat, forced air circulation, filtration, and automatic humidification. Both units are designed for installation in either utility rooms or basements.

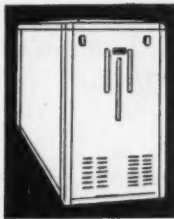


## SELL LOW COST HOT WATER

The Lochinvar automatic oil burning water heater is what every family is looking for—a water heater that is automatic and trouble free in operation yet costs much less than gas or electricity to operate. Attractive in gray with maroon trim and available in 20, 30, 40 and 50 gallon sizes. Write for prices today.



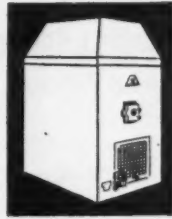
Lochinvar's Package-Unit, the Challenge-Aire, an automatic oil burning winter air conditioning unit shipped completely erected and assembled with blower motor and all controls mounted in position and wired, 24" wide, 54" high, 43" long.



Junior-Aire, an automatic oil burning winter air conditioning furnace with 80,000 B.T.U. output at register.



Model 100 A, an automatic oil burning winter air conditioning furnace with 110,000 B.T.U. output at register.



Model 100, an automatic warm air gravity furnace with 85,000 B.T.U. output at register.

# Lochinvar

C O R P O R A T I O N  
14247 TIREMAN AVENUE • DEARBORN, MICHIGAN



"Cut me out and send to Lochinvar Corporation, 14247 Tireman Avenue, Dearborn, Michigan for prices and descriptive literature."

- ☐ Model 80  
☐ Water Heater
- ☐ Model 80 G  
☐ Other Lochinvar models shown above

Name .....  
Address .....  
City ..... State .....

# AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES  
AND  
SHEET METALS

AND

Warm-Air  
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 109, No. 5

May, 1940

Founded 1880

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## In This Issue

ATTIC ventilation merchandising efforts are pictured in the composite advertising layout on this month's cover. 1940, it is expected, will break all previous records in the sale of attic ventilating fans.

The campaigns and the history of two of the country's attic fan pioneers are related in this issue. On page 44 Houston, Texas' pioneer (Way Engineering Co.) relates the 1939 campaign when 400 fans were sold and the progress made since the company started to sell fans in 1936. On page 50, the 1936-1939 attic fan campaign of Peerless A. C. Co., pioneer merchandiser in New Jersey, is explained.

Cooling dominates this month's Air Conditioning Section. Professor Konzo and R. B. Engdahl report a study of a small office building year round system; furnish the heat gain calculations and describe the general results obtained.

On page 53, F. O. Jordan gives complete details for a year 'round residential system the cost of which runs from \$1,000 to \$1,300. This includes a compressor and coil in a forced warm air system.

On page 41 we introduce a new author, Henriette Betlem, perhaps the country's only lady air conditioning engineer connected with a contractor. Miss Betlem will write four articles on "Engineering Which Can Be Sold" as contrasted to engineering theoretically excellent, but impossible to sell.

Two articles of unusual interest feature the Sheet Metal Section. On page 63 Lawrence Gichner describes his success with seamless tin and emphasizes the importance of water-tight flashing.

The West Coast's largest air conditioning system is located in the new home of Walt Disney Enterprises. The installation, one of the largest in point of tonnage, has many unusual fabricating details.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

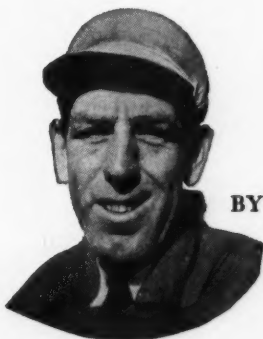
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**More than 8,000 copies of this issue are being distributed**



# What Kind of a Noise Annoys An Oyster?



BY TIM SHEARS



**A** SHEET METAL CONTRACTOR that keeps his eyes peeled won't have any trouble spottin' spots for jobs in Monel. An' if you want to find out if Monel's the best metal to use, just ask a few questions:

1. Does the job have to *look* good? If it does . . . Monel's a cinch. Monel looks good an' stays good lookin' . . . don't chip, crack or rust, an' being solid sheet it's got no coatin' to wear or peel off.

2. Do they have to keep this equipment good an' *clean*? If yes, then you can't beat Monel. You know, for instance, that it *can't* get rusty an' shined up it looks like nothin' else but silver. An' you don't need any fancy polishes to clean it with.

3. Does the job get lots of *wear* or *bumpin' around*? If *that's* the story you can bet your best brake the metal to use is Monel. After all, it's hard an'

stiff, as you know. An' in case you *don't* know, Monel is *stronger an' tougher than structural steel*.

However, now I've warmed up let's get to the point: There's *one* kind of place where you don't have to stop an' ask questions. The minute your nose says *fish*, your eyes say jobs for Monel. You can't *miss* 'em in a fish market or oyster bar. Counters, display cases, work tables, sinks, pails, an' other equipment galore! An' here's why it's ten to one the owner will ask for Monel:

Ice, water, fish scales an' salt . . . crabs an' oysters an' lobsters dumped in by the barrel . . . a swell combination to wreck any equipment. *An' salt!* If *that* can't eat into a metal nothin' can. But salt don't get far with *Monel*. The concerns that *make the salt* . . . they all use Monel. Crushers, Chutes, Hoppers, Rotary Dryers, Elevator Buckets, Screw Conveyors, an' what have you

. . . all made of Monel! It's the one metal that's strong enough an' tough enough, yet *isn't* corroded by salt.

Next time you drop in an oyster bar just remember . . . for equipment that has to stand up against water, ice an' salt . . . take plenty of bangin' around . . . an' still come up smilin' . . . the metal to use is Monel.

Of course, there's plenty of other places where they need jobs in Monel. Just cast your eye over the list below . . . also the kind of jobs you'll find. How do you make 'em up? Go right ahead in the usual way. If you want any dope on joints, or soldering or welding, just drop me a line.

TIM SHEARS

P.S. Pardon *me*, fellers. I forgot about the question I started off with. The answer: *A noisy noise annoys an oyster!*



Fish cases in this smart looking store are trimmed and lined with Monel. Sinks and work tables in the background were also good bets for the contractor . . . he made them out of Monel.

THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street New York, N.Y.

## JOBS IN MONEL

### Where to Look

Hospitals  
Stores  
Markets  
Schools  
Laundries  
Hotels  
Restaurants  
Cafeterias  
Lunch wagons

### What You'll Find

Table tops  
Sinks  
Oven linings  
Chutes  
Bins  
Containers  
Covers  
Drains  
Funnels  
Hoppers  
Pans  
Trucks  
Ventilating hoods  
Kick plates  
Push plates  
Water dispensers  
Shelves  
Scale pans  
Range and oven hoods  
Trays  
Pails  
etc., etc.



# QUIET AS A Randall PILLOW BLOCK

Stretch out, relax, it's Spring!

The utter stillness of early morning on a hidden bass lake is no more quiet than a Randall Pillow Block in operation. That's one reason why your blowers will have no metallic bearing noise with Randall Pillow Blocks.

Almost a million Randall Pillow Blocks are operating satisfactorily in the field on air conditioning equipment. Such a preference can only indicate a record of unsurpassed pillow block service.

Over a third of a century of experience in the design and construction of efficient bearings provides a thorough background for solving your bearing problems. Whatever your pillow block need, you can find the answer in the attractively illustrated No. 40 catalog showing the complete Randall line. Send for it today.

*Representatives Carrying Stocks*

**Tek Bearing Co.**  
177 Lafayette  
New York City

**C. W. Marwedel**  
San Francisco, Cal.

**Salt Lake Hardware Co.**  
Salt Lake City, Utah

**American Stock Gear Co.**  
100 St. Clair Ave., N. W.  
Cleveland, Ohio

ONE-PIECE STEEL HOUSING  
PILLOW BLOCK

This low-cost bearing is the most popular in the industry and the highest production in the Randall line. Available for shafts up to 1 5/16". Mounts in any position.



UNIVERSAL PILLOW BLOCK

Designed to meet the most exacting demands of engineers, the Universal operates satisfactorily in any position under severest conditions.



FLANGE PILLOW BLOCK

The rugged construction of the Flange provides ample safety factor for the most severe side mount bearing applications.



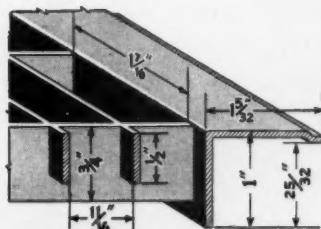
**RANDALL GRAPHITE PRODUCTS CORPORATION**  
DEPT. 511 609 W. LAKE ST. CHICAGO, ILL.





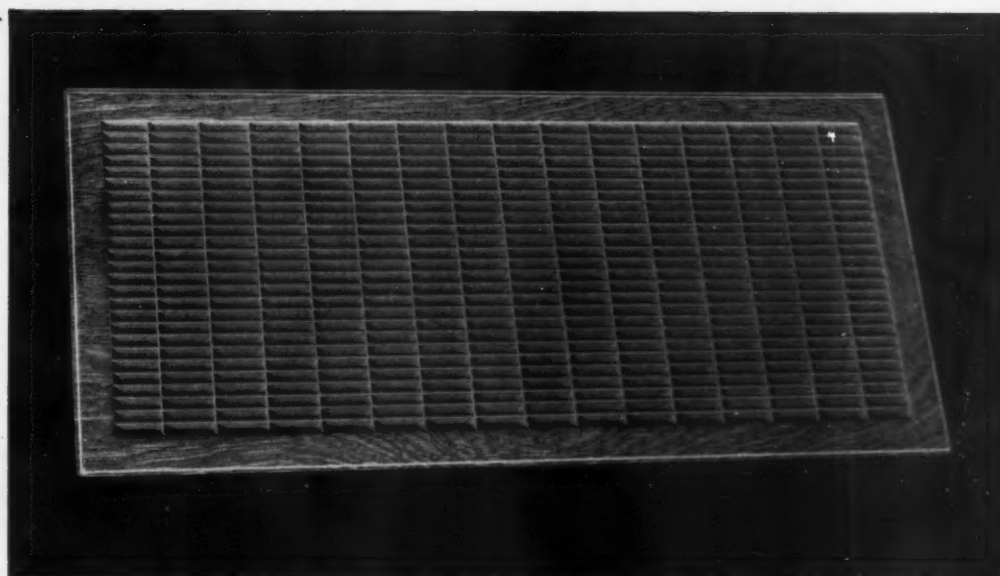
# THEY'RE \*NONPAREIL, B' GAD!

"WITHOUT EQUAL" — as  
Webster has it.



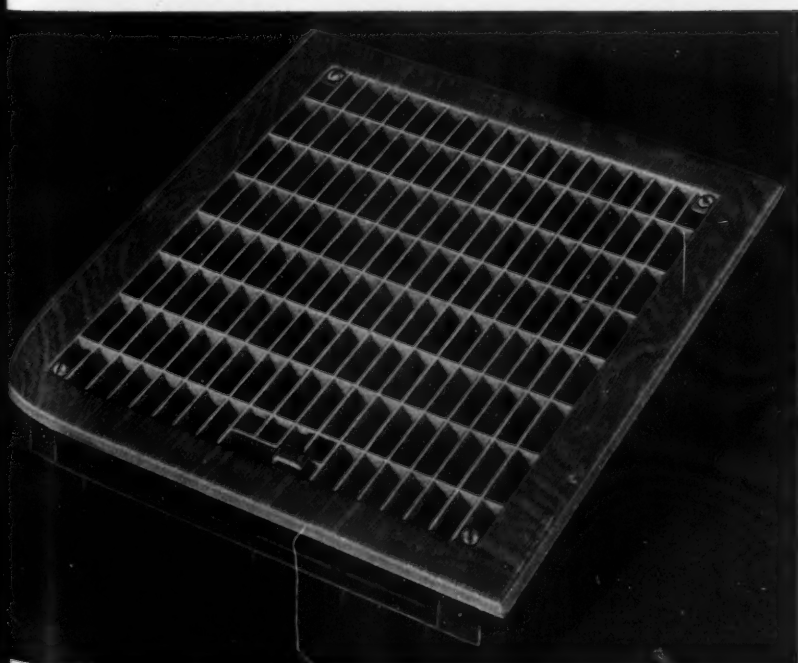
#### No. 265 "No-Flex" Return Air Face

Has unusually large free area (averaging 84%), exceptional strength and rigidity due to the cross members being welded to each other and to the frame at frequent intervals. Cross members have squared edges for improved walking surface and better appearance. The strength, rigidity and general high quality of No. 265 Face are evident at a glance.

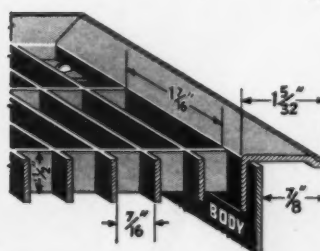


Make any comparison you wish and you're bound to agree with the Colonel that H & C "NO-FLEX" Registers and Return Air Faces are entirely in a class by themselves—better made, better looking, more efficient, and sure to make a better impression on your customers and prospects. And since these are all pluses that cost you nothing extra, it's just good business to standardize on these outstanding items. You get more for your money.

Be sure to specify H & C when you buy registers.



#### No. 210 "No-Flex" Floor Register



Mesh openings measure  $7/16"$  x  $1-7/16"$ , sufficiently narrow to completely avoid the catching of heels, yet large enough to permit free passage of the air. Face, which is removable for easy cleaning, is attached to the body by screws which are concealed below the level of the register face. Hi-baked, lustrous finishes assure lasting attractiveness. Your customers will appreciate the superior quality of No. 210.

## HART & COOLEY MANUFACTURING CO

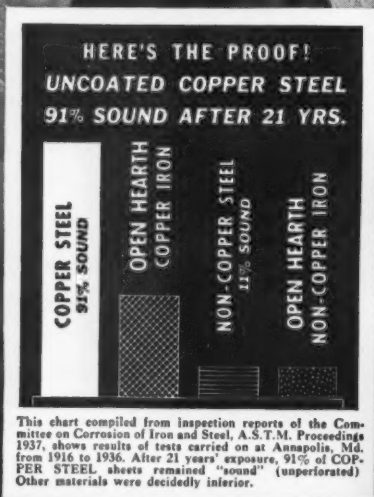
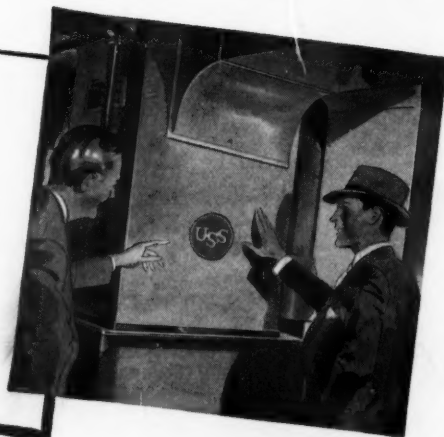
FACTORY AND ENGINEERING SALES OFFICE:

HOLLAND  MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulley

Can furnaces and  
duct work last the life  
of a building?



**YES**—if they are built

of U·S·S Galvanized Copper Steel! And surprising as it may seem, it costs less than a dollar more in the average home to build the duct work of this *longer lasting* metal. While plain galvanized steel gives good service in normal usage, for humidified air systems, the extra rust resistance of U·S·S Copper Steel is needed.

Look at the corrosion chart shown here. Various types of iron and steel commonly used for duct work were tested for 21 years in the open air. Copper Steel proved itself vastly superior. It has 2 to 3 times the rust resistance of plain steel or pure iron.

U·S·S Galvanized Copper Steel gives you *plus* selling value. Building owners immediately see the value of steel with double rust resistance—especially for damp locations.

Write for our booklet on U·S·S Copper Steel. We'll gladly send you complete information.

*When duct work carries humidified air, there's always danger from rust. By building with U·S·S Galvanized Copper Steel you can provide two to three times the resistance to atmospheric corrosion.*



## GALVANIZED COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago

COLUMBIA STEEL COMPANY, San Francisco

TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors

United States Steel Export Company, New York

# UNITED STATES STEEL



# Here's Proof

## THAT THE "TRAINED" MAN CLICKS

THOMAS W. TORR, Chief Engineer  
RUDY FURNACE COMPANY

### TALKS STRAIGHT FROM THE SHOULDER ON THIS VITAL TOPIC OF TRAINING

One after another, leaders in the Forced Warm Air Heating Industry have expressed themselves in this publication on the need for men who have been trained to engineer, sell, install, and service Winter Air Conditioning Equipment.

I agree with them. But I believe that an ounce of experience is worth a pound of generalities. So, let's get right down to cases.

Take Jay Boslough, for instance. Jay is President of the J. Boslough Heating & Air Conditioning Corporation, of Wilmette, Illinois, and our "Rudy" dealer in that territory. Nobody can kid Jay. He's the kind of hard-headed, practical business man who knows what he is talking about. The other day I asked him what he thought about the value of trained men in our business. Here's what he said:

*"When I put in a job, I want to know from the start that it is going to be right, so that all of my profits won't be eaten up by call-backs. Another thing I want to be sure of is that my customers are going to be boosters for me, and not knockers."*



*"The only sure way I know of to do this is to either hire trained men, or have my own men trained. And I would like to see every other contractor in this business do that very thing, because every unsatisfactory forced warm air heating installation is a black eye for the entire industry."*



*"Today, I would not hire a man who has not had training. I have three of them in my sales organization, one of whom is a university graduate. Another is a graduate of the Industrial Training Institute, whom I put to work about a year ago."*

*"When this man came to me, he told me how the Institute had given him both theoretical and practical training in Winter Air Conditioning. I decided to find out. So, I put him on the street soliciting business, cold-turkey. He made good! Then I put him to making estimates and layouts. He clicked! Now he is in general charge of the office and is my right-hand, inside man. Does training pay? I would hate to try to stay in the forced warm air heating business without trained men!"*

We here at the Rudy Furnace Company hear this same story almost every day. H. R. Harrison, our General Sales Manager, after twenty-eight years in the warm air heating field, is as convinced of the necessity for trained men as I am.

When so much evidence is piling up on every hand, isn't it about time we all woke up? You distributors! You dealers and contractors! What are you doing to provide training for the men in your organizations, so that they can help you grow and prosper? This thing isn't something you should postpone. The time to act is NOW.

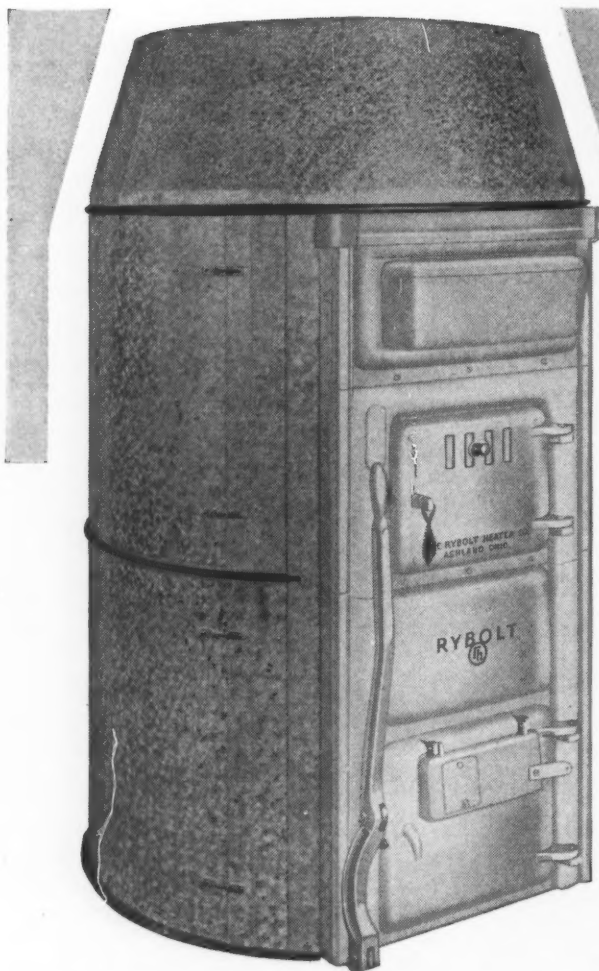
So, if you are really interested in this question of training, and would like to know more about the training program which has been developed by the Industrial Training Institute especially for our industry, just write me and I will see that you receive complete information, for we believe their training course is sound.

I do this only because I am anxious to further any movement to better equip the men of our industry with basic training by which they can do a better job for the public.

*T. W. Torr* Chief Engineer

RUDY FURNACE COMPANY, DOWAGIAC, MICHIGAN

NOTE: I am glad to avail myself of this space, presented as a contribution to the industry by the Industrial Training Institute. T. W. T.

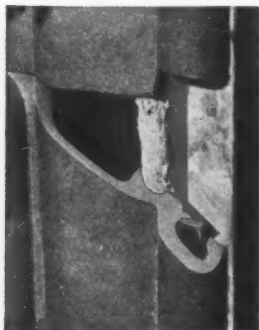


## *The New* **RYBOLT** *Steel Furnace* **SERIES 4000**

● This new RYBOLT steel furnace is thoroughly modern with many special features that insure efficiency, convenience and operating economy. Yet its moderate price adapts it ideally for low cost housing limitations. The shell and radiator of boiler plate steel are first riveted, then reinforced by welding to make one seamless unit, absolutely leak-proof and smoke- and gas-tight. The deep firepot, lined with high quality refractory material holds a large amount of fuel for long firing. The large RYBOLT duplex ball bearing grates provide ample area for correct air volume and complete combustion. Smoke is minimized by the hot blast smoke consumer in the fire door and the special smoke curtain.

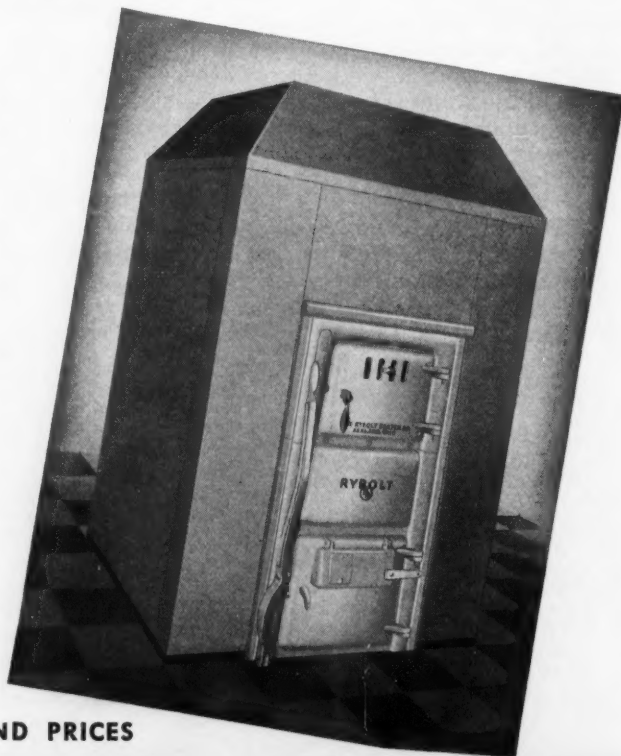
**CASED TO SUIT YOUR TASTE**—Where desired the heating unit can be furnished with a square casing finished either in smooth gray Hammerloid enamel or galvanized iron. The casing of the round furnace is galvanized iron only.

**AVAILABLE FOR STOKER FIRING**—When ordered for stoker firing this RYBOLT unit comes equipped with special chutes on both sides, with sealing plate and gasket to cover chute not used.



### **CONCEALED BOLTS**

—Adding to the attractive appearance of this RYBOLT Series 4000, bolts are concealed by the cleverly designed front, which is slotted at the edges to receive the bolt heads and hold them securely in place. The part of the front bolted to the shell is securely sealed against leakage by asbestos rope packing.



WRITE FOR ILLUSTRATED DESCRIPTIVE FOLDER AND PRICES

**THE RYBOLT HEATER COMPANY**  
**615 MILLER STREET • ASHLAND, OHIO**



## WAGNER MOTORS - *for Reliable Service*



### A Good Motor is not enough - It must be the **RIGHT** Motor for the job

In selecting the motor for air conditioning equipment it is important that you select the right type of motor—a motor exactly suited for the job. That is why Wagner builds such a wide variety of motors . . . to make it possible to select the **RIGHT** motor regardless of the speed, torque, or current characteristics involved.

#### *Experience*

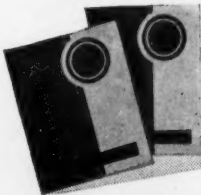
Wagner pioneered in the air conditioning industry. Nearly 50 years of engineering and manufacturing experience is built into every Wagner motor.

#### *User Satisfaction*

The dependability of Wagner motors is an advantage to both the user and the dealer or contractor making the installation. A dependable motor minimizes service calls which sometimes seriously reduce the profit on an installation.

#### *Customer Confidence*

Wagner motors are correctly designed by experienced engineers, carefully constructed of the finest materials by highly skilled workmen, and thoroughly tested at every step in their manufacture. All of which means that Wagner motors give years of satisfactory service which builds confidence and good will for the dealer or contractor who made the installation.



#### *Send for These Bulletins*

Wagner motor bulletins MU-177 and MU-182 contain complete information on design, construction, and performance of Wagner motors used on air conditioning equipment. Send for your copies today. They are free.

### Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

MOTORS • TRANSFORMERS • FANS • BRAKES

In order to properly select a motor to drive any part of the equipment of an air-conditioning plant, the following points should be considered along with the first cost and maintenance.

#### **Load Cycle**

What maximum and minimum horsepower is involved, and what is the probable duration of each?

What are the maximum starting torque requirements?

Is the duty cycle continuous or intermittent, and what method of control and overload protection is contemplated?

#### **Power Supply**

A.C. or D.C., and frequency if A.C.

Voltage.

Phase.

Special starting current limitations, if any, imposed by the power supplier.

#### **Speed Characteristics**

Single constant speed.

Variable or multispeed.

#### **Mechanical Construction**

Is open type motor acceptable, or should Splash proof, Totally-enclosed fan-cooled, or Explosion-proof motor be used?

### MAIL COUPON TODAY

WAGNER ELECTRIC CORPORATION

M40-20

6400 Plymouth Avenue  
St. Louis, Missouri

Gentlemen:

Please send me **FREE** bulletins MU177 and MU182.

Name \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

WHEN YOU SAY *Service*

A hand is shown holding a thermostat unit, which is labeled "THERMOSTAT TYPE T44A1X3 SCALE 60 TO 90 F. FINISH SILVER". The background shows a wall of many similar thermostat units. A large, stylized outline of a hand is superimposed over the scene, holding the unit being shown. In the bottom right corner of the image area, there is a logo that reads "AUTOMATIC CONTROLS MH".

*When* YOU say service, you probably have some vague definition of the term in mind. But when WE say service, we mean virtually instantaneous delivery of equipment from factory stocked branches and distributors in all important cities in the United States and Canada, as well as foreign countries. All are staffed by factory trained engineers, who are available to you at all times, without cost or obligation.

## MINNEAPOLIS-HONEYWELL

Minneapolis-Honeywell Regulator Company, 2726 Fourth Ave. S., Minneapolis, Minn. Canadian Plant: Toronto, Ontario. European Plant: London, England. Company owned branches in 49 other cities.

*Control Systems*





**MORE**

# **SUNBEAM**

## **AIR CONDITIONERS**

**have been installed than any other make**

**T**HE REASON SUNBEAM has won leadership in the Winter Air Conditioning field is simple. For 10 years Sunbeam Units have *proved* their efficiency, dependability and economy . . . have given the public full value.

Today *you* can cash in on Sunbeam's established sales appeal — and increase your profits. The complete line offers you Units for Oil, Gas or Coal — automatic or hand-fired — in all sizes for all types of homes. The whole residential market is open to you.

In addition, Sunbeam Units are available for quick delivery from convenient Jobbers' Warehouse stocks. And right now you can sell Sunbeam Units on our Summer Finance

Plan: No down payment — no payments till October 15th — up to 3 years to pay — you get cash on installation!

Sunbeam's National Leadership can bring you local leadership. Write today for the complete Sunbeam Story and for the name of the nearest Sunbeam Jobber.

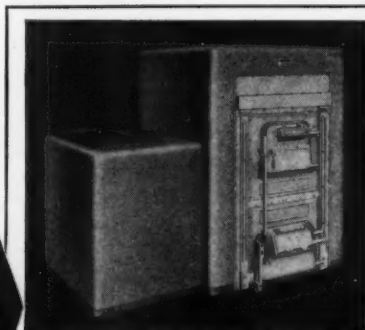
**AMERICAN** & **Standard**  
**RADIATOR** & **Sanitary**

*New York CORPORATION Pittsburgh*

Copyright 1940, American Radiator & Standard Sanitary Corporation

*Visit our building at the  
New York World's Fair.  
Ask for  
Mr. Frank Stubbs,  
our Exhibit Manager.*

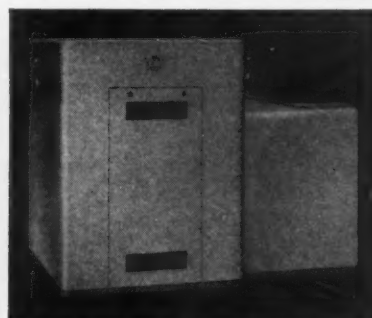
**AMERICAN**  
HEATING EQUIPMENT  
COSTS NO MORE THAN OTHERS



**Sunbeam Air Conditioner Series No. 80**  
An efficient, moderately priced Air Conditioner. Models for hand or stoker fired coal or oil.



**Sunbeam Air Conditioner Series HL**  
A new, efficient gas-fired Air Conditioner with cast iron heating element.



**Sunbeam Air Conditioner Series No. 1100**  
For automatic oil firing exclusively. Burner and Air Conditioner are matched and coordinated.

# Field Experience Has Proved the Value of *Voltage Protection*



## Frank Talk About "Puffs" Brought Criticism

Four years ago, Penn Electric Switch Co. announced its line of stack switches incorporating *automatic Voltage Protection* to provide a positive safeguard against ignition failure in the event of subnormal voltage on the supply line. Oil burner manufacturers and dealers using Penn stack switches have since reported a surprising decrease in the number of unexplainable "puffs." The reason, briefly, is that such failures due to voltage drop on the supply line *cannot occur with Penn-built stack switches.*

## Penn Stack Switches give plus value—and here's why

With conventional stack switches, it is possible to pump slugs of oil into the combustion chamber with a slowly turning pump, even at supply line voltages so low that the standard ignition transformer will not give a dependable spark across the electrodes. This fact was discussed frankly in Penn's announcement of its revolutionary *Voltage Protection* feature.

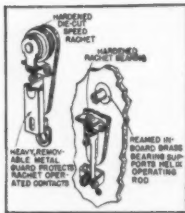
Equally frank were Penn's remarks about the frequency with which such supply line voltage drops occurred in oil burner markets. Obviously, oil burner dealers could not be expected to study supply line conditions with recording voltmeters to verify this fact, as Penn engineers had done before announcing *Voltage Protection*.

It is Penn's basic business policy that control problems be recognized early, studied thoroughly, discussed frankly and solved simply. Now manufacturers and dealers have reported on thousands of installations with Penn Type 670 (continuous ignition) and Type 672 (intermittent ignition) Stack Switches. They verify the fact that *Voltage Protection* is a simple solution to what has been a major problem.

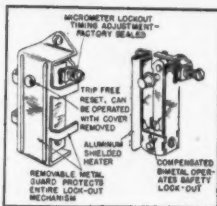
You will find this field experience of others a sound basis on which to select and specify stack switches and other automatic heating controls. Penn Electric Switch Co., Goshen, Indiana. In Canada: Powerlite Devices, Ltd., Penn Electric Switch Division, Toronto, Ont. Representatives and distributors in all principal cities.

## Built for Years of Dependable Performance

Penn stack switches are trim and modern in appearance, simple and compact in design and sturdily constructed. Cases are heavy gauge pressed steel. A polished radiation shield reflects heat radiated from the stack, protecting operating parts against excessive temperatures.



Helix and ratchet mechanism are engineered as a closely coordinated unit, equally efficient on low or high temperature stacks. The Penn improved speed ratchet assures the positive contact action possible only with a ratchet structure, yet is much more compact and quiet than designs previously offered.



Relay, rated for 1 H.P. load, possesses greater pull-in and hold-in power than competing units for similar service. This contributes to long life of the electrolytic silver relay contacts... assures the positive contact action that reduces wear on burner motor and operating parts.

Simple internal circuit, entire absence of flexible leads to moving contacts, low voltage to thermostat circuit and generous wiring space are some of the other features of Penn stack switches that are popular with users. Detailed information on request.

A compensated bi-metal safety warp switch assures positive shutdown in the event of ignition or flame failure. Reset device is trip-free, making it impossible to operate the burner with reset button permanently depressed. Insulated warp switch heater is enclosed in an aluminum shield.



More information on what Penn Controls will  
do for you—One of a Series.

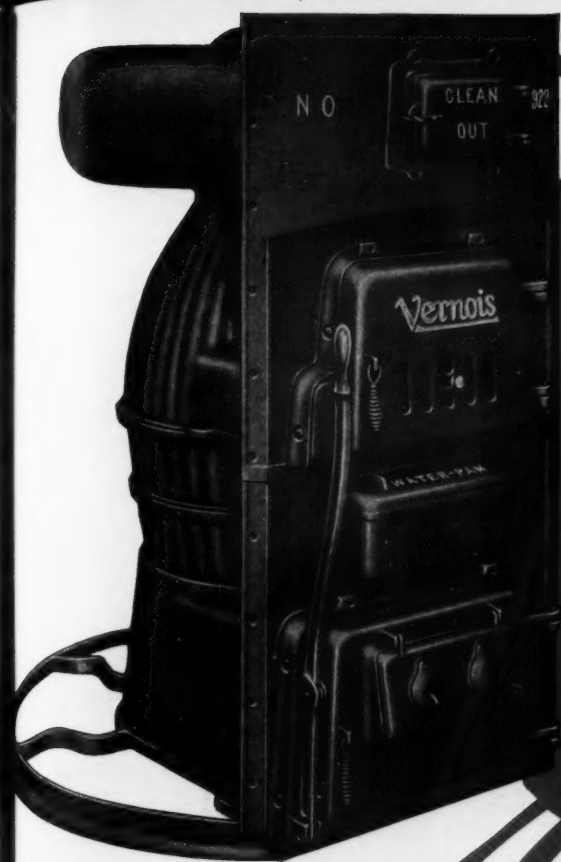
# PENN

## Penn-Built Controls for Many Applications

Thermostats, Bonnet Controls, Ductstats, Fire Protection Controls, Water Temperature Controls, Boiler Pressure Controls, Boiler Water Level Controls, Humidistats, Stack Switches, Stoker Timer Relays, Solenoid

Gas Valves, General Purpose Relays, Solenoid Refrigerant and Water Valves, Refrigeration Pressure and Temperature Controls, Water Valves, Pump Controls, Air Compressor Controls, Air Volume Controls, Line Starters.





# GET THAT "GRAVITY" HEATING BUSINESS

## "VERNOIS" FURNACES ASSURE MAXIMUM BUSINESS IN THIS TREMENDOUS FIELD

From all indications the 1940 season is going to be one of the most profitable in the long history of gravity heating. This type of heating installation has always been a steady, dependable source of profit to warm air heating men able to give their customers the three prime requisites of a GOOD installation—Quality . . . Efficiency . . . Correct Price. Dealers and contractors handling the Mt. Vernon "VERNOIS" Fur-

nace know that quality and efficiency are assured because this superior furnace is constructed of "Vernalloy," proven in actual tests to be much more enduring than ordinary iron. This strong construction results in top efficiency and economy of operation assuring trouble free operation and economical heating for the home-owner.



## *The* MT. VERNON *Line Sells!*

Many dealers have made handsome profits pushing the sale of VERNOIS Furnaces and there is no reason why you shouldn't do likewise. Intelligent and aggressive promotion coupled with the proven quality of the Vernois Furnace will give you a head start on your competition. We'd suggest you write today for further information.

*Write for the 1940 Merchandising Plan at Once!*

# Vernois FURNACES

**MT. VERNON FURNACE & MFG. CO.**

**MT. VERNON**

**ILLINOIS**

*Your Production needs  
are met with*  
**WEIRTON**  
*Galvanized Sheets*

There is a type of Weirton Galvanized Sheet to satisfy your exacting needs, whether it is *finish*, to accentuate the appearance of your products, or *adherence of coating*, to withstand your forming and drawing operations.

The same full measure of care and supervision is exercised in the manufacture

of Weirton Galvanized Sheets as that which marks the production of WEIRTON Tin Plate—WEIRITE.

Get the maximum in quality and service for your production line—get galvanized sheets that meet your exacting production needs—make your next order Weirton Galvanized Sheets.

## **WEIRTON STEEL COMPANY**

## **WEIRTON, W. VA.**

Boston, 1324 Statler Office Building; Chattanooga, Hamilton Bank Building; Chicago, 2128 Builders Building; Cincinnati, 2606-7 Carew Tower; Cleveland, 1217 Leader Building; Denver, John S. Worthington Co., 511-513 Mercantile Building; Detroit, General Motors Building; Houston, 1901 Franklin Avenue; Indianapolis, Chamber of Commerce Building; New York, 405 Lexington Avenue; Philadelphia, Broad Street Station Building; Rochester, Genesee Valley Trust Building; San Francisco, 824 Sharon Building; St. Louis, E. R. Hensel Company, Cotton Belt Building; Montreal, Quebec, A. C. Leslie & Co., Ltd., P. O. Box 1420; Toronto, Ontario, A. MacNish, 357 Bay Street.

division of



**NATIONAL STEEL CORPORATION**





Peerless Attic Fans are crashing thru with the biggest volume of business in their history, it's the talk of the trade. Plenty of reasons why, for instance, Peerless Attic Fans are better than ever in performance, looks and price plus the fact that they are backed up with hard hitting advertising which can't help but boost your sales and profits. The name Peerless is definitely established with your trade, it needs no introduction. They have been delivering cool,

healthy ventilation for over 45 years and are well known by the public.

The product, price, performance and promotion of Peerless Attic Fans for 1940 has got 'em all talking. Dealers by the score are tying up with the Peerless line. Write today for more detailed information.

*See Your Distributor or Jobber*

**THE PEERLESS ELECTRIC CO.**  
**WARREN, OHIO**

**PEERLESS ELECTRIC CO. • WARREN, OHIO**  
Please send complete details on your  
Attic Fans.

Name \_\_\_\_\_

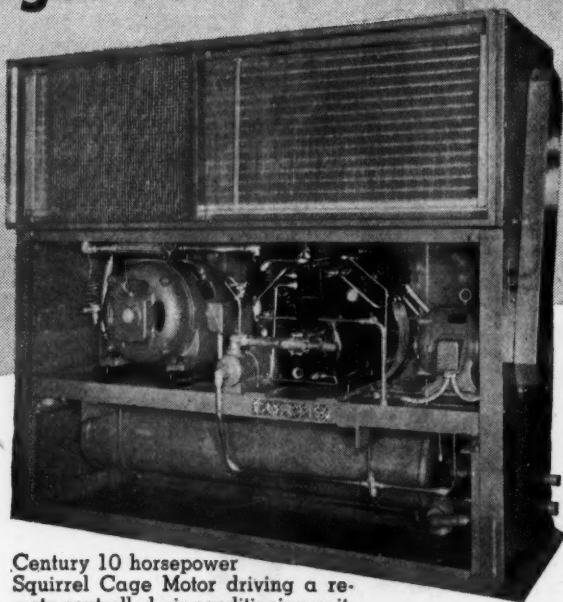
Address \_\_\_\_\_

Town \_\_\_\_\_

State \_\_\_\_\_

# Century

## Meets All Requirements of Packaged Air Conditioners



### Wide Acceptance by Equipment Manufacturers Proves Their Value to You

Nobody likes noise—especially in a packaged air conditioning unit! That's one of the reasons why so many manufacturers of air conditioning equipment specify Century Motors. They and their customers like the quiet, smooth starting and operating performance of Century type SCH, Squirrel Cage High Torque Motors, and their ability to meet the operating requirements of the modern refrigeration compressor.

Because peak performance depends on the application of the correct electric motor drive, more and more manufacturers are standardizing on Century Squirrel Cage Induction Three Phase Motors.

Since the earliest days of air conditioning, exacting research and close cooperation with many of the country's leading refrigeration engineers, have combined to produce Century Motors which today are powering thousands of air conditioning applications throughout the world.

Century 10 horsepower  
Squirrel Cage Motor driving a re-  
mote controlled air conditioning unit.

Here are eight good reasons why Century Type SCH Motors are ideally suited to meet air conditioning power requirements:

1. Unusual ability to start, accelerate and bring the compressor up to full speed without over-motoring the running load.
2. This break away torque is generally sufficient where reasonable variations from normal conditions occur in the installation.
3. Locked rotor or starting currents in conformity to E.E.I. and N.E.M.A. limits.
4. Unusually quiet starting.
5. Unusually quiet running.
6. Long life—due to excellent mechanical construction and electrical insulation.
7. Easy to keep clean outside—motors keep themselves clean inside.
8. Excellent exterior appearance to match modern equipment design.

When you too specify Century Motors for your product or your installations, you're assured of maximum performance with top economy. You'll find it profitable to let your nearest Century Motor Specialist help you with your plans. His years of experience in correct motor application are at your service—call him in.

### CENTURY ELECTRIC COMPANY

1806 Pine Street St. Louis, Missouri  
Offices and Stock Points in Principal Cities



One of the Largest Exclusive Motor Manufacturers in the World



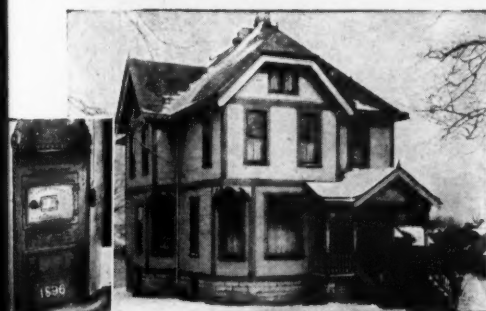
# Do These "Old Faithfuls" Represent The Type of Furnaces You Want to Sell?

(These and Thousands of Other Old Timers  
Are Still Serving Faithfully)

WEIR furnaces had QUALITY built into them from the start—and QUALITY is built into every product of this firm TODAY—whether it is built for coal, oil or gas.

Some of the workmanship that goes with it can be seen—but most of the actual extra QUALITY is invisible—until many years of gratifying performance "on the job" demonstrate and prove Weir-Meyer in-built superiority.

That is what a WEIR-MEYER dealership offers you today—PLUS



Sheffield, Illinois  
Owner: E. F. Hartz  
Installed 1896



Cape Girardeau, Mo.  
Owner: W. H. Vogel  
237 Ellis St.  
Installed 1906



Waterloo, Iowa  
Owner: Louis Dickman  
Saxon & Logan Aves.  
Installed 1896

MODERN DESIGN FOR EYE APPEAL  
AND CONVENIENCE.

ENGINEERING THAT HAS PRODUCED  
HIGHEST EFFICIENCY IN HEAT TRANS-  
FER FROM COAL, OIL & GAS.

RESEARCH THAT HAS DEVELOPED AND  
CONTRIBUTED MUCH TO TODAY'S  
AIR-CONDITIONING ADVANCEMENT.  
AN ALL-INCLUSIVE LINE FOR ALL  
FUELS AND EVERY POCKETBOOK.

A DEALER-ATTITUDE THAT MAKES  
DEALERS WANT TO STAY "HITCHED"  
TO US AND OUR PRODUCTS. (25-YEAR-  
OLD WEIR DEALERSHIPS ARE NOT UN-  
COMMON.)

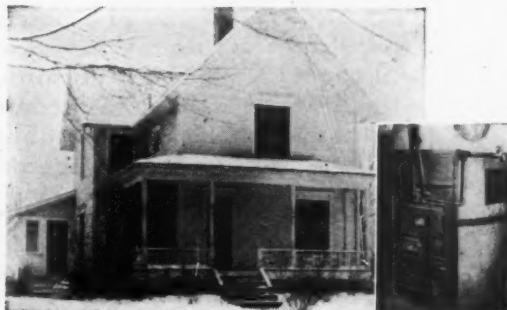
A DEALER-HELP PROGRAM THAT NOT  
ONLY HELPS YOU GET NAMES "ON  
THE DOTTED LINE"—BUT ALSO HELPS  
YOU WITH YOUR JOB DESIGN AND  
INSTALLATION PROBLEMS.



McPherson, Kansas  
Trinity Lutheran Church  
Installed 1898



LaPorte, Indiana  
Owner: C. L. Rhoades  
1703 Lincoln Way  
Installed 1903



Lake Odessa, Mich.  
Owner: Thomas Johnson  
Installed 1907



Established 1866

Manufacturers of Weir and Meyer Fur-  
naces and Air Conditioning Equipment for  
Coal, Oil and Gas.

*This name-plate on Furnaces and Air-Condition-  
ers means the Utmost In Dealer Protection and  
Customer Satisfaction.*

One of the most comforting cir-  
cumstances about the WEIR-  
MEYER franchise is that you are  
protected in your territory. YOU  
develop it—YOU get the ben-  
efits.

THE MEYER FURNACE CO.  
Your story appeals—send  
all details—  
(Sign or clip to your letterhead)

# MATCH THE CAREFUL DESIGNING OF YOUR STOKER

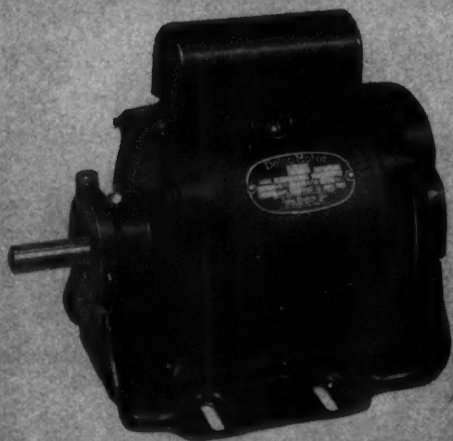
## *Specify* Delco Motors

**Assure Quiet Operation.** Delco motors for stokers are characterized by exceptionally quiet, vibrationless operation—a safeguard against transmitting noise through heating ducts and pipes. This is accomplished by precision manufacturing, dynamic balancing, and the use of oversize bearings machined to tenths of a thousandth of an inch.

**High Starting Torque—High Overload Capacity.** The most popular Delco Products motor for stokers is the condenser-start type, providing the high starting torque required by all types of stokers. The Delco centrifugal switch gives positive, snap-action starting . . . eliminates fluttering. High overload capacity is assured by the use of ample materials and highest quality insulating materials, and by allowing ample space for windings.

**Ample Protection.** The possibility of motor injury resulting from iron, scrap, or other foreign material in coal is reduced to a minimum in Delco Products motors for stokers by the accurate Delco thermotron. On some applications, terminals are supplied to turn on warning light when thermotron cuts out motor.

**Your Choice of Two Types.** Delco motors for stokers are available in totally enclosed or ventilated types. The Delco Products Engineering Department will cooperate with you in determining the right motor for your product.



### DELCO MOTORS FOR APPLIANCES ARE DESIGNED FOR THE PARTICULAR JOB

*For refrigerators, washers, ironers, oil burners, stokers, blowers, and air conditioners—there are Delco Products motors that will assure long service and satisfaction, because they are designed right, built right. Behind every Delco motor is Delco's long experience in meeting the requirements of the appliance field. Safeguard the excellence of your own product by specifying a Delco Products motor—proved on millions of appliances.*

# DELCO

DIVISION OF GENERAL



# MOTORS

MOTORS CORPORATION



# MONCRIEF

*Continually Expanding*  
to Fulfill Today's Demands

● The Moncrief line has been enlarged amazingly of late years so that it now includes 227 types and sizes. This gives the Moncrief dealer the widest possible selection of specialized units to fill all demands in his community.

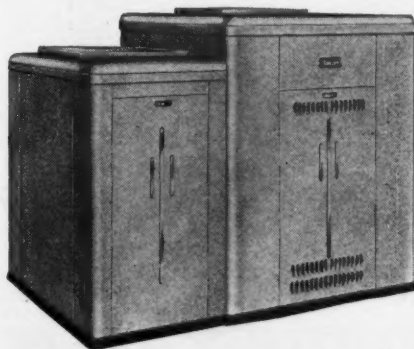


SERIES "C" CAST

You will profit most with the complete Moncrief line. It gives you ample profit margin. The units are assembled for quick, easy installing—quality-built to give the home owner enduring satisfaction.

Get acquainted with the profit-making possibilities of the Moncrief Proposition. Write today for particulars.

**The Henry Furnace & Foundry Co.**  
3473 East 49th St. • Cleveland, Ohio



ARISTOCRAT OIL-FIRED AIR CONDITIONER

SEE ALL THAT MONCRIEF  
OFFERS YOU-

## WINTER AIR CONDITIONERS

Aristocrat Oil-Fired  
Special Oil-Fired  
Utility "55" Oil-Fired  
Aristocrat Coal-Fired  
with cast heating unit  
Aristocrat Coal-Fired  
with steel heating unit  
Series "700" Stoker-Fired  
with steel heating unit  
Series EE Coal-Fired  
with steel heating unit  
Moncrief Square-Cased  
with Blower-Filter Unit  
cast and steel heating units  
Aristocrat Gas-Fired  
Special Gas-Fired  
"BAC" Gas-Fired



MONCRIEF  
Blower-Filter  
Unit

## WARM AIR FURNACES

De Luxe Long Life  
cast and steel heating units  
Standard Long Life  
cast and steel heating units  
Series "C"—Cast  
Series "S"—Steel  
Series "D"—Steel  
Series "E"—Steel  
In square cased enamel finished  
and standard galvanized casings  
Series "F" Cast  
Series "GG" Gravity  
Gas Furnaces  
Moncrief Blower-Filter Units  
Moncrief Automatic Humidifiers  
A Complete Line of Warm Air Heating  
and Air Conditioning Pipe and Fittings



New! MONCRIEF  
DE LUXE LONG LIFE  
with 20-year Guarantee




*Moncrief Supplies Everything Used on a Warm Air Heating and Air Conditioning Job*

# HE WASN'T A "DOUBTING THOMAS" after he made this test



Here you see how ARMCO galvanized PAINTGRIP sheets hold paint. Half the length of this galvanized sample was PAINTGRIP-treated before painting. Observe how readily the paint over the untreated galvanized section scaled off under the knife blade. Then notice how difficult it was to scrape the paint off the PAINTGRIP-treated section. Why is PAINTGRIP so much better for painting than plain galvanized?

• PAINTGRIP sheets have two distinct advantages. They can be painted immediately without acid-etching or weathering. The slightly granular nature of the mill-applied *bonderized* finish makes an ideal base for paint. This surface can be seen plainly in the photomicrograph at the right. 

Then, PAINTGRIP actually helps preserve paint. You know how a raw galvanized surface encourages the formation of zinc compounds that dry out paint and cause cracking and peeling. Since the PAINTGRIP finish is *neutral* in nature, it serves to insulate paint from the zinc and thereby greatly retards aging. Paint looks better and lasts longer.

Use ARMCO galvanized PAINTGRIP sheets wherever your work needs the immediate beauty and protection of paint. They work easily and their cost is moderate; usually less than  $\frac{1}{2}\text{¢}$  per sq. ft. more than plain galvanized. For prices and quick deliveries, call the nearby ARMCO Distributor, or write us direct. The American Rolling Mill Co., 1491 Curtis St., Middletown, O.



ARMCO



GALVANIZED PAINTGRIP

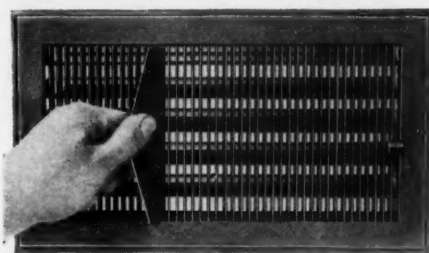




# 4-WAY FLOW AIR-CONDITIONING REGISTERS



## FULL FACE COVERAGE LINES



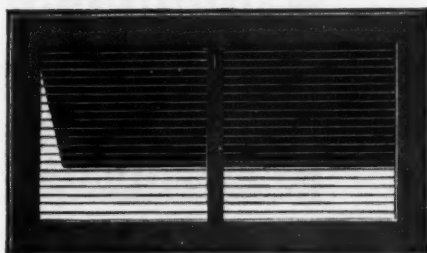
### NEW 4-WAY FLOW FLEX-BAR

Style 256 U. S. Air-Conditioning Register

This new development of the U. S. Air-Conditioning Register Line furnishes complete adjustment of Air-Flow by setting of multiple valves to any degree of Up or Down Flow required.

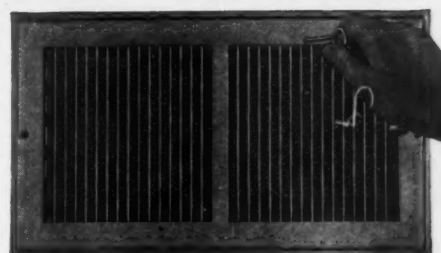
Direction of side flow is accomplished by using a handy setting wrench on the Flex-Bars in the Grille to get any Left or Right directional flow required.

This Style of Flex-Bar Register is recommended for Air-Flow setting at the time of installation. Unlike some designs of this type, the U. S. Style 256 Flex-Bar Register is durably constructed so that any required grille-bar settings may be made without damaging the register.



2 new U. S. Designs—256 and 249—both 4-WAY FLOWS—are lines of outstanding quality in their price classes.

Style 256—Bendable Grille Bars for Side Flow Setting. Style 249—Adjustable Grille Bars for Side Flow Adjustment. Both 256 and 249 with Horizontal Multiple Valves for Up Flow and Down Flow directional Air Streams.



### NEW 4-WAY FLOW MULTI-LOUVER ADJUSTABLE-BAR

Style 249 U. S. Air-Conditioning Register

This is truly the peak of perfection in Multi-Louver Adjustable-Bar Registers—proven by dealers everywhere who have installed the New STYLE 249.

There are no puzzling features to develop trouble—no "trick" untried gadgets. It gives you instantaneous regulation of any angle Up Flow to 45° Down Flow with the Side-Lever smooth operating Back-Blades. It gives you any desired degree of Side Flow to 45°—Left, Right, or Left and Right—by simply setting the vertical (key-pin-operated) Adjustable Grille Bars.

Without exception, this STYLE 249 Line excels wherever multi-louver adjustable-bar registers are specified or desired to perform a full area of face coverage air flow function.

## For Fixed Directional-Flow

Style 153 and similar types of U. S. Air-Conditioning Registers with Horizontal Bar Grilles equipped with Single Valves render perfect directional flow and Conceal Interior of Stack Head. Recommended for competitive installations where adjustment of air flow is not required. Unusually low list prices on these types of A-C Registers.



Send for New 1940 Price Schedules

# UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

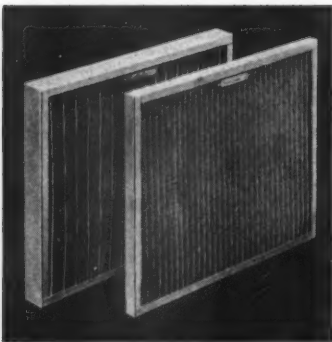
# Install *Kleensflo* Forestall COMPLAINTS



**The Common-Sense Service that Insures  
Customer Satisfaction and Good Will**

## MAY WE HELP YOU?

AIR-MAZE *Kleensflo* filter panels can be furnished in any reasonable size and shape to meet the requirements of any air conditioning system. We'll be glad to furnish data to help you solve your air filter problems. No charge nor obligation.



● To meet competition it is unfortunately often necessary for air conditioning manufacturers to install low-priced "throwaway" filters in their equipment. In a steadily increasing number of instances these initial filter installations are later replaced by AIR-MAZE *Kleensflo* filter panels.

The reason is that the customer has come to realize that maximum performance of his air conditioning system is largely dependent on the efficiency of the air filter panels. He further is impressed with the fact that while the first cost of an AIR-MAZE *Kleensflo* permanent filter panel is slightly higher, in the long run it is more economical by far because *Kleensflo* needs no replacement—only an occasional cleaning at a cost of a few cents.

This suggests a marvelous opportunity for you to render an outstanding service to your customers. Naturally you want your customers to receive the highest degree of satisfaction from the equipment you sell them. Why not insure this from the very beginning—when your system is first installed?

That's when customers are most critical—that's when you are most likely to receive complaints. That's also when your customers are most apt to recommend—or knock—your system to their friends. Forestall complaints—head off dissatisfaction and adverse criticism—by installing AIR-MAZE *Kleensflo* permanent air filters *right at the start!* It means greater satisfaction to your customers—increased good will and more business for you.

AIR-MAZE *Kleensflo* permanent air filters have a tested efficiency of 98.0% to 99.6%. With reasonable care they will last as long as your air conditioning equipment and continue to give dependable trouble-free performance throughout their long life. They are of all-metal construction, sturdy, odorless and *approved as fire retardant by the Underwriters Laboratories*. They protect your system and your business.

**APPROVED  
BY THE  
UNDERWRITERS  
LABORATORIES**

*Write for Complete Catalog*

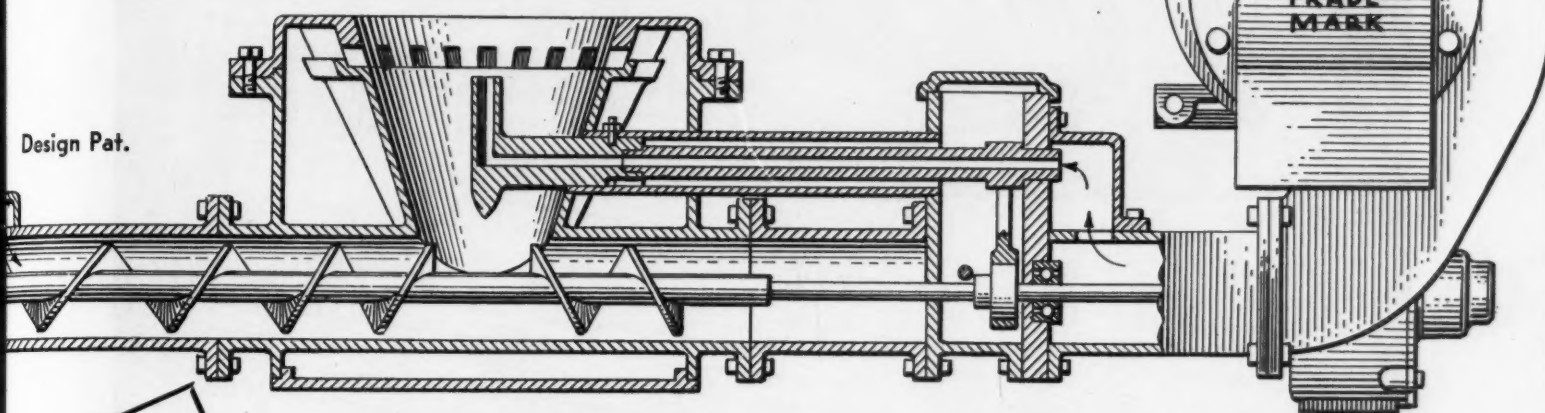
AIR-MAZE CORPORATION • 5130 HARVARD AVENUE • CLEVELAND, OHIO

# AIR-MAZE



# IT'S HERE AT LAST!

A Revolutionary Development in a Low Cost Bin Fed Stoker that will... Successfully burn High or Low Volatile Coal



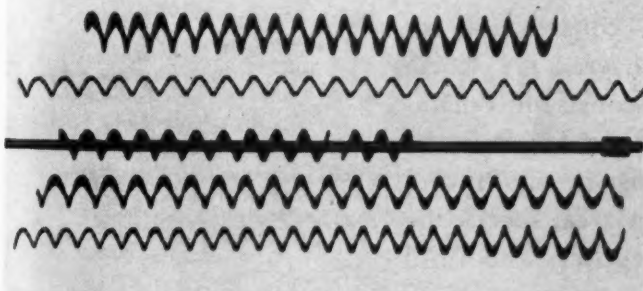
Complete  
Gray Iron  
Castings (Only)  
**\$59<sup>50</sup>**  
F.O.B. Detroit

A successfully proven Air-Cooled oscillating agitator that will burn coking coal. Can be easily removed when burning non - coking coal if desired.

## ATTENTION

**STOKER & FURNACE MANUFACTURERS  
STOKER DISTRIBUTORS & DEALERS  
COAL PRODUCERS & COAL DEALERS**

If you are interested in an extremely low cost proven *Bin-Fed* Stoker that will successfully burn either high or low volatile coking coal and wish to avoid the long delay and high cost of producing one, here is your opportunity to complete your line. We offer our entire Bin-Fed stoker castings that you can easily assemble and install with your own name plate on it and sell at a profit.



### FLEXIBLE STOKER SCREWS

Tapered bin worms made of rust resisting steel alloy with varying pitches to allow for proper flow of coal and still prevent back-smoke. Easily extended and shortened to any length and coupled on the job by means of stainless steel tapered pins. Hard high heat resisting cast steel flights for use in the retort. *Will stand up under the severest heat!*

We will supply a SCREW for a 4" tube at 50c per running foot for use in our stoker. Price includes flights securely electrically welded on shafts.

We are able to twist practically any size worm with any desired pitch and offer the same either with or without shafts.

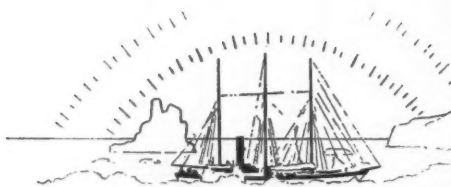
*A first class continuous drive Transmission with adjustable pulleys. Motors and controls at extremely low prices if desired. Developed and manufactured by*

# F. D. YARICK

18953 ROSELAWN AVE. - - - DETROIT, MICH.



Our stoker is easily assembled and installed in any furnace. Will feed coal from any angle. Write today for further information.

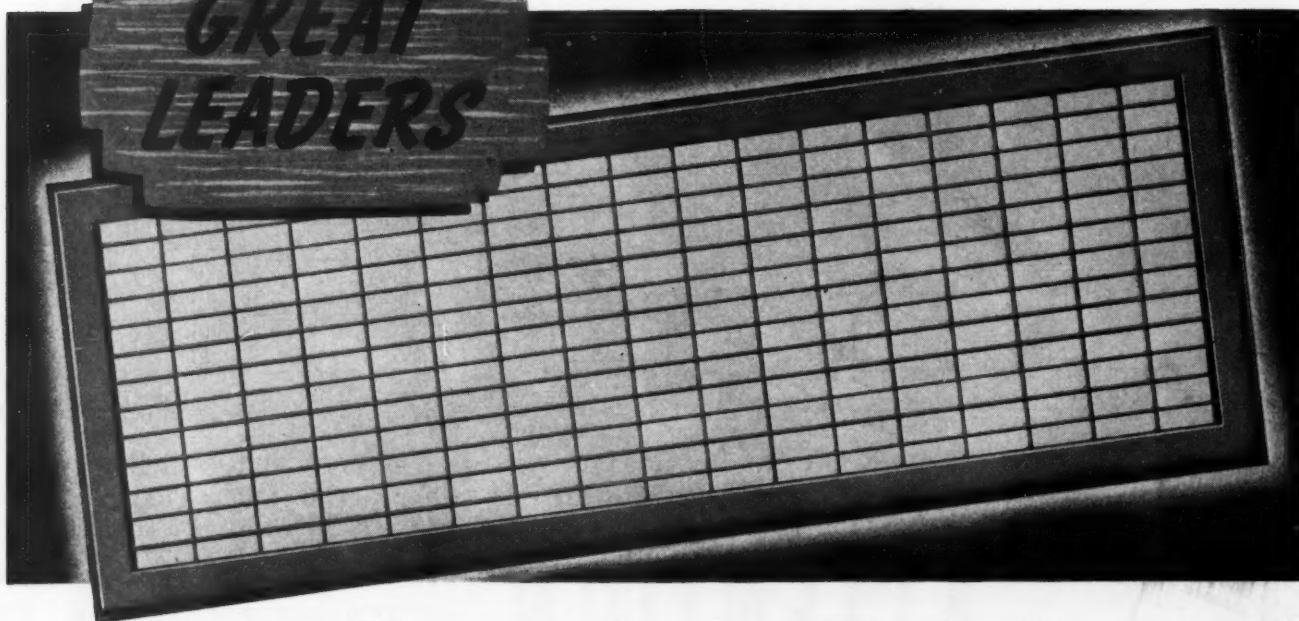


## ADMIRAL PEARY

### *First to the Top of the World*

His discovery of the North Pole in 1909 was an achievement that wrote his name large in the history of exploration.

**GREAT  
LEADERS**



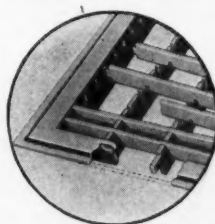
## Independent "Fabrikated" *"Tops" in the Register World*

• Independent discovered "Fabrikated" construction not many years after Admiral Peary discovered the North Pole; and Independent "Fabrikated" has consistently maintained its lead by constant improvements throughout the years. If you are looking for the utmost in rigidity and strength, fine appearance and free open area, specify the original Independent "Fabrikated" Registers and Cold Air Faces. Made in types and sizes to meet any specification for gravity and air conditioning installations.

*Send for catalogs*

**THE INDEPENDENT REGISTER CO.**  
3747 E. 93rd STREET CLEVELAND, OHIO

The grille bars are steel strips set on edge, forced together under pressure, and held firmly by openings cut in outer frame.



# INDEPENDENT "Fabrikated"

FLOOR REGISTERS AND COLD AIR FACES  
AND AIR CONDITIONING REGISTERS AND GRILLES

(REG.  
U.S.  
PAT.  
OFF)

540



*Residences in Lawrence, L. I., N. Y.  
Sutton Park Inc., Developers  
Edwin Kline, Architect  
Roslyn, L. I.*



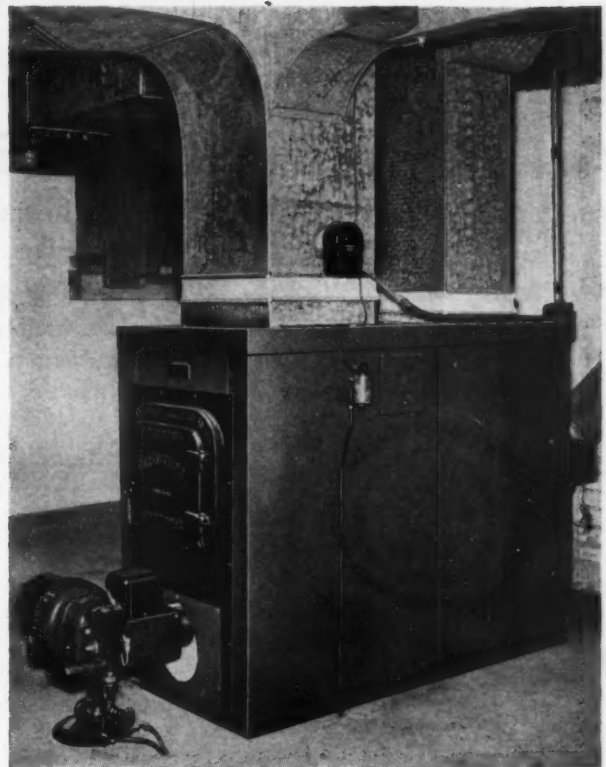
*... and one good  
reason why ... the*

**FITZGIBBONS**

*Directaire*  
**CONDITIONER**

Most prospective buyers know that outward beauty in a house, while important, is only skin deep, but *character is indicated in the basement*. This is certainly the case in these attractive Long Island homes where the first inspection by their ultimate owners disclosed a sturdy Fitzgibbons Directaire ready to start providing healthful comfort at the snap of a switch, and to keep right on providing it at a saving which will give their owners something to crow about when good suburbanites get together.

Build a reputation for economical comfort in the conditioning systems you install. Sell Fitzgibbons Directaire. Write for details of selling plan and Catalog AA.



*Neat and businesslike Fitzgibbons Directaire installations like this are helping to insure owner satisfaction from the low-cost six-room house to the finely appointed residence. Sizes from 80,000 to 600,000 B.t.u. Quick and simple installation. Easy Servicing.*

***Fitzgibbons Boiler Company, Inc.***

*Air Conditioning Division, 101 PARK AVENUE, NEW YORK*

*Works: OSWEGO, N. Y.*

*Branches and Representatives in Principal Cities*

# Look! AMAZING NEW BUSINESS!

## ★ PHILCO-YORK AIR CONDITIONERS

**Real, Complete, Portable Air Conditioning!  
Easy-to-handle Package Merchandise.  
No Plumbing, No Wiring, Quickly Installed.**

A business that is growing even faster than electric refrigeration in its early days. And no trade-ins! No saturation! No expert service! Big dollar profit! And you sell and deliver in an easy-to-handle package.

Think of the market! Millions of offices, hotels, hospitals and homes from coast to coast. A repeat business . . . three or four sales to a single home . . . hundreds of units in a single office building, hotel or hospital.

Philco-York, for 1940, gives you the most *complete* line of portable air conditioners ever offered. A model to cover every field . . . and at *new low prices!*

Limited and restricted dealer distribution—write today—immediately—for full details of the Philco-York Air Conditioner dealer franchise, dealer discounts, special credit terms and illustrated, descriptive literature.

### MAIL COUPON NOW!

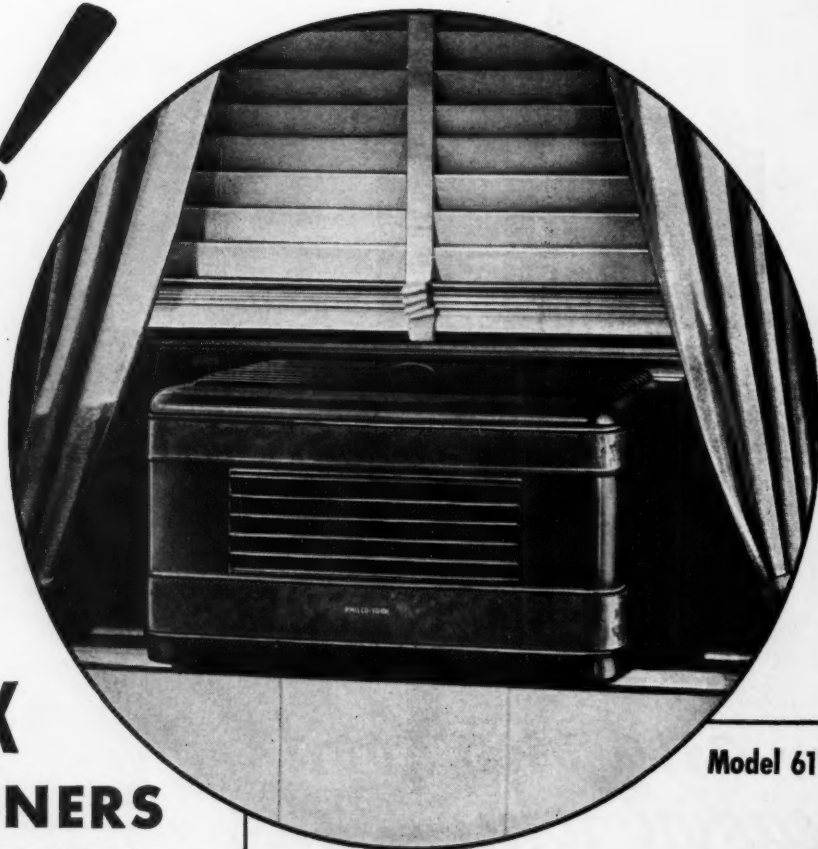
**PHILCO, Air Conditioning Dept. 531  
Tioga and C Streets, Philadelphia, Pa.**

Please send me full details of your dealer franchise proposition on Philco-York Air Conditioners, together with Discounts and Special Wholesale Credit Terms. Also send big, new Illustrated Book.

NAME \_\_\_\_\_

STREET \_\_\_\_\_ COUNTY \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



Model 61

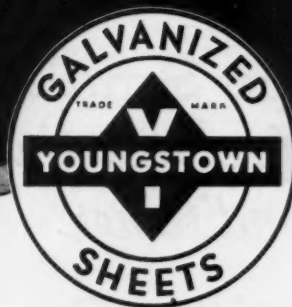
**NOW—Efficient Air Conditioning  
for Home and Office at a price  
the public can pay!**

- ★ **COOLS AND CONDITIONS ROOM AIR.** Cools, purifies and gently circulates the air . . . real, complete air conditioning.
- ★ **DE-HUMIDIFIES.** Wrings out moisture, leaving air cool, dry and stimulating.
- ★ **DRAWS IN FRESH OUTSIDE AIR.** Gives you continuous supply of fresh, clean, cool air.
- ★ **FILTERS OUT DUST, DIRT AND POLLEN.** A boon to the hay-fever sufferer.
- ★ **REMOVES STALE, STUFFY, INSIDE AIR.** Replaces it with fresh, clean air.
- ★ **CIRCULATES AIR THROUGHOUT THE ROOM.** No drafts or unpleasant air currents.
- ★ **SHUTS OUT STREET NOISES.** Closed windows give you peace and quiet.
- ★ **GIVES YOU PURE AIR ALL YEAR-'ROUND.** In any weather, rain, snow, heat, dust storms, you get clean healthful air, free from dust, dirt and pollen.

**There's a Philco-York Air Conditioner for  
every size room, now priced as low as...**

# \$129<sup>50</sup>





# 48 $\frac{1}{3}$ TONS OF WATER..

PER SQUARE FOOT OF DUCT PER YEAR

That's why air conditioning jobs need the corrosion resistance of Youngstown's Galvanized Sheets.

No one regrets the passing of the old hot air jobs--but they had one advantage--the air in them was practically bone dry and virtually non-corrosive to duct work. Modern air conditioning has increased the corrosion problem in sheet metal ducts many times.

Because your reputation depends on the service your duct jobs give, you will need the quality that Youngstown builds into every Youngstown Galvanized Sheet. Made by expert steel men, the base metal in Youngstown's Galvanized Sheets is outstanding for its uniform ductility. In the galvanizing process, Youngstown's modern manufacturing procedures assure a positive adherence and a uniform thickness of corrosion-resistant zinc.

Youngstown Sheets not only offer a solid wall of zinc to resist corrosion but their uniform workability helps your men to faster time and better workmanship.

★ This figure is based on a normal cooling job with air leaving the coils at 85% saturation -- 55° dry bulb temperature, 4.7 grains moisture per cubic foot of air and duct velocities averaging 1000 f. p. m. -- for 8 hours a day and 300 working days per year.

10-11C

THE  
**YOUNGSTOWN**  
**SHEET AND TUBE COMPANY**

Manufacturers of Carbon and Alloy Steels  
General Offices - YOUNGSTOWN, OHIO

# FHA Type Small Home Designed for New Vertical Oil Air Conditioner



## Utility Room Installation of PREMIER Model Rx4 Saves Duct Work—Cuts Fuel Costs

Today's vast demand for small homes in the \$2,500.00 class has created a great new heating market. This new market, however, presents tough problems. Not only do the severe cost limitations rule out most standard types of central heating plants, but in addition a growing majority of these new small homes are being built without basement. This, of course, demands a utility room installation.

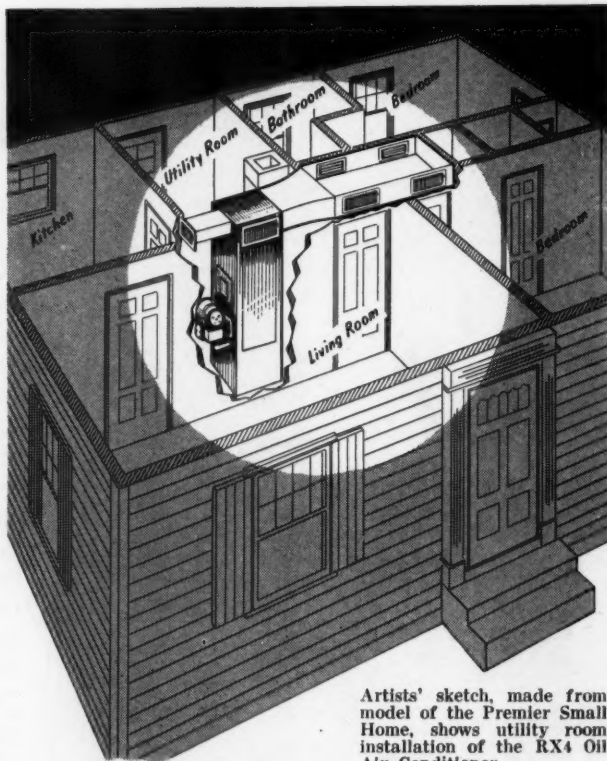
Premier heating engineers, after long study of this small home market, reached two conclusions. First, an entirely new type of equipment is required. Second, to meet the strict cost limitations, there must be closer cooperation between builder and heating engineer, so as to cut installation costs to the bone.

Acting upon these conclusions, Premier engineers took two steps. First, they designed a new high efficiency Oil Air Conditioner for top performance in utility room installations.

Second, they commissioned an architect to design a new small home that would demonstrate the most simplified and economical form of installation.

This new design conceives a home literally built around the heating plant. The result—an estimated reduction of 50% in installation costs. At the same time this home is completely livable and fully complies with FHA requirements for homes of this type.

The unit itself—designated as the Premier RX4, is shown at the lower left. It includes heavy, electric



Artists' sketch, made from model of the Premier Small Home, shows utility room installation of the RX4 Oil Air Conditioner.

At right, the Premier Model RX4, Oil Air Conditioner for utility room installation. Uses minimum floor space—provides maximum heating area.

Below, the RX5, substantially the same as the RX4, except designed in conventional horizontal style, for basement installation. Both units in streamlined steel cabinet, with handsome gray corduroy enamel finish.



welded steel furnace, Oil Burner, Filters, Centrifugal Blower, special Oil Line Filter, Draft Adjuster, and Automatic Controls. It occupies a minimum of space, yet is believed to have more heating area than any other unit of comparable capacity.

At upper right is shown the home designed as a demonstration of how economically the unit can be installed.

Note that the ceiling of the hall is lowered to provide a plenum chamber which directly supplies all but two of the warm air registers.

Return grills may likewise be connected directly to the unit, through the walls of the utility room. Ordinarily, however, it is recommended that returns be located in outside walls.

Since the introduction of the RX4 many hundreds of these units have been sold and installed. In service, the unit has fully demonstrated its ability to supply an abundance of warmed, filtered, moistened air to all corners of all rooms, at a fuel cost far lower than is ordinarily possible.

Data on the RX4 furnished free. Plans of the FHA home available at low cost.

**PREMIER FURNACE CO.**  
DOWAGIAC, MICH.



# Bringing The Outdoors-- **INSIDE!**



Every day in many a shop, office, restaurant or farm building, the air becomes so foul and stuffy that it is impossible to keep wide-awake. Men who work under such a handicap for any length of time are easy to sell on the idea of installing ventilators.

The next few months will be the best of the year to sell ventilation. Choose a good ventilator—one you know is right—and push it. As a suggestion, buy a small "GLOBE" from your local sheet metal distributor and show it to your prospects. And, while you are explaining its construction, don't forget to mention that "GLOBE" efficiency has invariably proved itself in every kind of service for more than half a century.

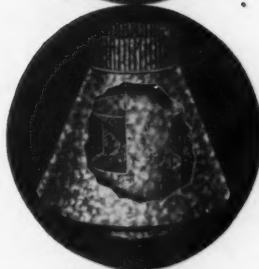
THE J. M. & L. A.  
**OSBORN Co**  
Manufacturers—Distributors  
BUFFALO • CLEVELAND • DETROIT

## OTHER OSBORN PRODUCTS AVAILABLE FROM YOUR SHEET METAL DISTRIBUTOR



### TYPE "A" VENTS

Prevent down drafts on gas flues. Scientifically designed; the efficiency of the Type "A" has been proved under the most severe operating conditions.



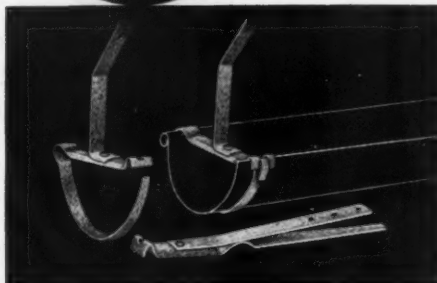
### BACK DRAFT HOODS

For use on gas appliances to prevent accidents.



### ROOFING CLIPS

Made from  $\frac{1}{8}$ " x  $\frac{3}{8}$ " half ovals and cadmium plated. Fit any standard section used for purlins.



### EAVES TROUGH HANGERS

"Golden Star" single bead hangers are fast and easy to install. They fit all makes of trough and cost little more than wire hangers.

A DEPENDABLE SOURCE OF SUPPLY FOR 81 YEARS



# BURNER BUILDING

## ● Proving That 18 Years of Conscientious Service and Development Reap Their Own Reward

A symbol of aggressiveness, a monument to quality merchandise priced correctly, a tribute to "the customer is always right" sales policy . . . is what the new plant of the Aldrich Company in Wyoming, Illinois, might be termed. This new air conditioned and daylight factory, consisting of over 37,060 square feet, is devoted entirely to the manufacture of oil burners and oil burner products.

This modern, new plant was built on and for volume sales. There are 24 distinct and different types of burners being produced daily. Streamlined production takes the rough casting through to completed burner without lost motion and in record time. Every operation is checked and rechecked before it proceeds to the next and so on until final inspection when the burner is okeyed and sent on its way to one of the numerous manufacturers or dealers who are cashing in on oil burner sales. In short, the most advanced equipment and machinery have been installed to build the world's most modern oil burners.

### The Original Burner

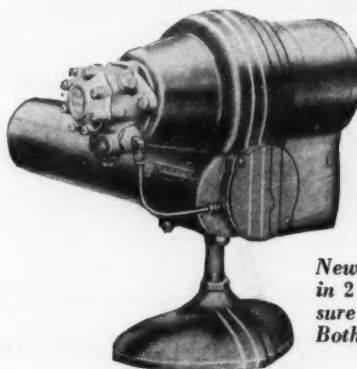
The original or the first burner in the HEAT PAK LINE was put on the market in 1935. This burner was the result of Lloyd I. Aldrich's 33 years in the manufacturing business, of which 24 years were spent in the developing of household appliances and 13 devoted entirely to the development of oil burners. The original burner, known as the HEAT PAK and introduced to the trade in 1935 was the forerunner of the 24 models now offered.

The New Departure burner, see illustration, recently announced to the trade, is the result of five years' extensive development and improvement of the original burner. This burner sets new standards of design and performance, higher efficiencies than heretofore thought possible with small fires. Positively no pulsating fires in any

furnace or boiler and ranges in capacity from 2 qts. to 2 gals. per hour.

It is designed to enable the Aldrich customer to go after FHA jobs . . . just another proof of progressiveness. It has four revolutionary and

exclusive features that mean lower cost automatic heat, high efficiency, finest performance and long life.

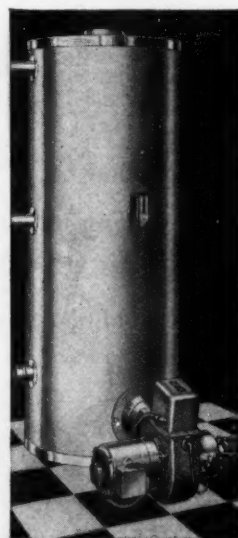


*New Departure Burner. Built in 2 models—one for high pressure and one for low pressure. Both priced for the 1940 market.*

### Boiler-Burner Unit

In an effort to supply dealers and contractors with a fast-selling small home heating system, Aldrich has developed the boiler-burner unit illustrated. Durably constructed and incorporating several new and advanced features, this unit is distinguished by the "percolator action" method of water agitation which causes the water to circulate over the prime heating surface *ten times as fast as without*.

Here is a complete oil-fired forced circulation package unit—a complete heating plant except for pipe and radiation. Everything ready to deliver as soon as it is ordered, and a really valuable addition to your service.



*Heat Pak, boiler burner unit. Pays for itself in fuel savings.*

(Advertisement)



## SAV-HAF Is Latest Development

This latest development, the "SAV-HAF" Burner is another milestone on the trail of oil heating progress and leadership which has been blazed by Aldrich in the past five years.

In an effort to supply the manufacturers and dealers with the most complete and efficient line of oil burners in the history of the trade, Aldrich has added the revolutionary "SAV-HAF" which, as rigorous, impartial tests have shown, will perform with the usual top-notch efficiency of an Aldrich burner at about half the cost!!!

NEW in principle—in design—in efficiency, it is the first and one of the few domestic burners to carry the approval of the Underwriters' Laboratories for burning No. 5 oil. Truly and without question this particular unit is a handsome tribute to the ingenuity and engineering prowess of the Aldrich organization.

## The Heat Pak Line

The Heat Pak line, now consisting of 24 units, has been developed over a period of years with the thought in mind of giving the oil burner trade one source of supply for any oil burning product necessary from the smallest to the largest, the simplest to the most complicated.

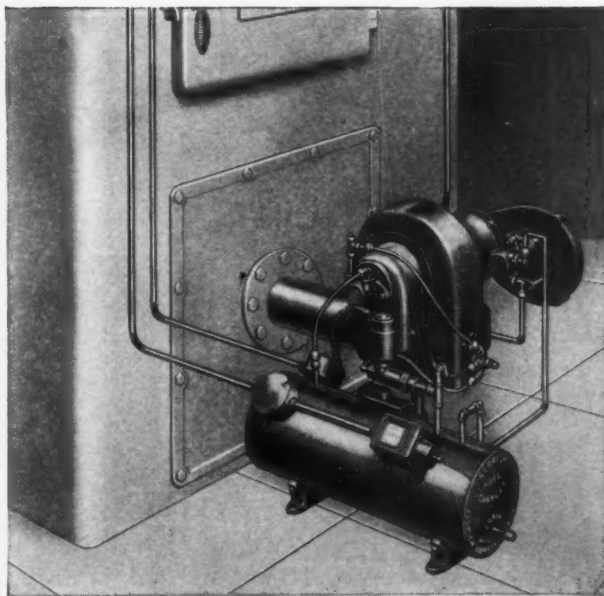
This line today consists of the following:

Pet	Giant
Glo Fyr	Double-Duty
Fyr-Fly	Sav-Haf—3 models
New Departure	Carbonaire
Triumph	Oil-n-Aire
Gnome	Galvanized Water Heaters
Compact	—4 sizes
Compact X	Burner Boiler Units
Heat Pak Standard	—4 sizes

These models, with their variations, are used as a basis for the production design of original equipment for large users such as furnace and boiler manufacturers. In this field Aldrich excels all others in volume sales, due to the fact that a great many of the accounts they supply maintain their own experimental laboratories which give valuable engineering assistance and cooperation to Aldrich engineers, thus enabling them to furnish a tailor-made product which can be conscientiously sold under their own brand as an integral part of their product.

## Merchandise Backed By Famous "No Argument" Aldrich Guarantee

The Aldrich burners now being built in the new modern plant, which is devoted exclusively to the production of automatic oil burners, are sold un-



SAV-HAF, MOST RECENT MEMBER OF THE HEAT PAK LINE, OFFERS OIL BURNING AT A COST COMPARABLE TO "COAL SHOVELING"

der the most complete and comprehensive customer's guarantee regarding replacement of defective parts and defects of operation within the industry. While a considerable portion of the production of Aldrich burners are sold under various other brands, this money back to every dissatisfied customer guarantee is extended to every purchaser of an Aldrich burner regardless of the brand under which it is sold. This plan, plus the superb quality built into Aldrich built burners, has enabled the Aldrich Company to double its burner sales each year for the past few years and has gained the confidence of all manufacturers and dealers who have had any dealings with the Aldrich Company.

• • • • •

The Aldrich Company welcomes inquiries from manufacturers of furnaces and boilers who have an oil burning problem as well as from aggressive dealers who are interested in a complete and profitable line of oil burning equipment. Aldrich engineers will be happy to work with manufacturers who are interested in developing or improving their oil burning equipment.

## COUPON

Aldrich Company,  
Wyoming, Illinois.

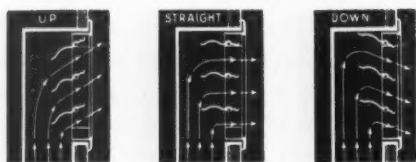
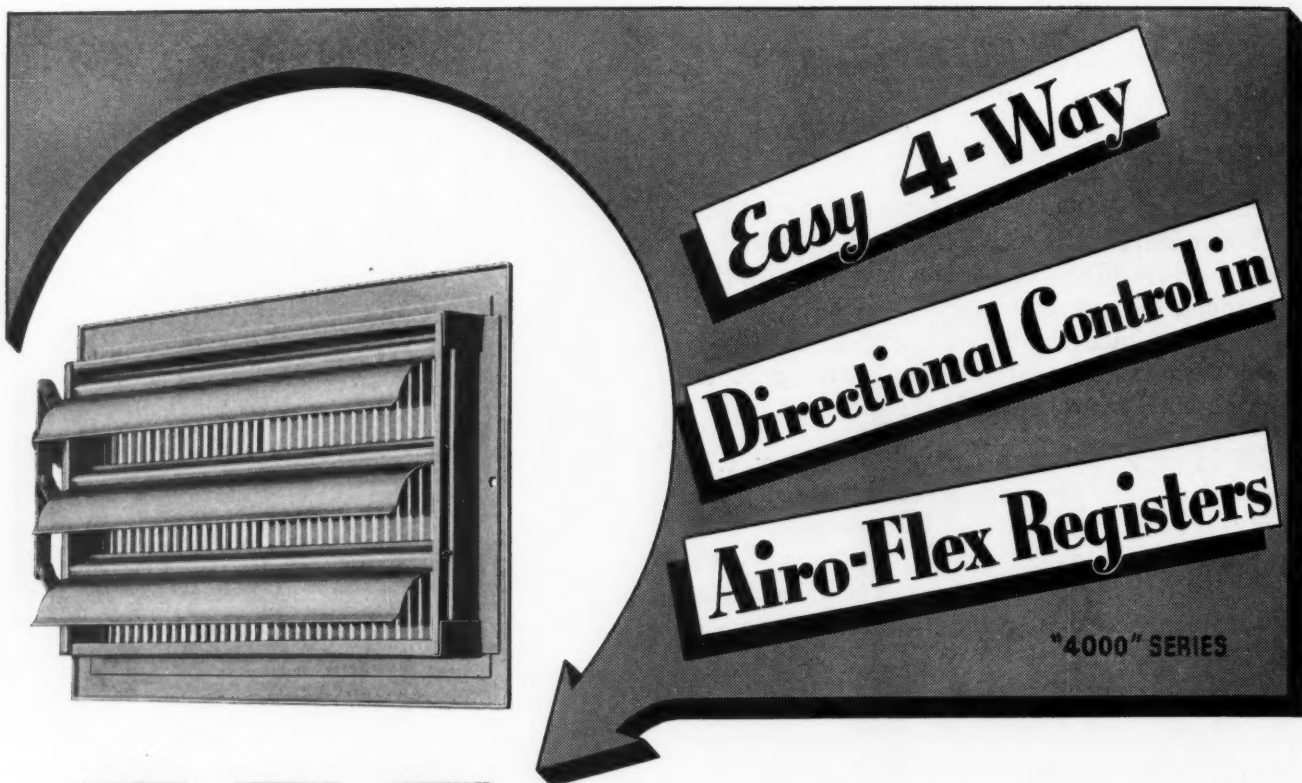
Please send literature on complete Heat Pak Line.

Name .....

Address .....

City ..... State.....

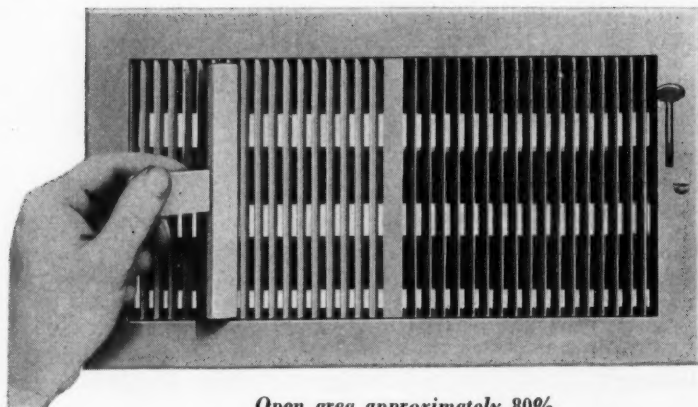
(Advertisement)



## Multi-Plane Louvre Control at Back—Easy Adjustment of Grille Bars for Sideway Air Deflection!

Why buy a more complicated and expensive register, when this new Auer Airo-Flex gives you, at a medium price, every essential air control advantage?

Up-and-down flow is regulated by efficient Multi-Plane Louvre, consisting of 2 to 4 back blades, depending on size of register. Air direction may be at any desired angle up, straight, or as much as  $22\frac{1}{2}^\circ$  down. Back blades are operated by lever, and air-tight when closed.



Open area approximately 80%.

For lateral directional flow, grille bars are so constructed as to permit a reasonable amount of adjustment at installation for any combination or single current, straight, right, or left. Adjusting tool furnished with register. When delivered, registers have grille bars set at  $35^\circ$ , half to right and half to left.

The Airo-Flex design is also made in the "7000" Series, with horizontal grille bars and single blade louvre.

A register of noteworthy beauty, the Airo-Flex is also extremely easy to install and to adjust. It is a practical register, without frills or gadgets. See this simpler, more economical register at your supply house. New complete Auer Register Book 40, just off the press, sent on request.

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

# AUER DISTINCTIVE REGISTERS

& GRILLES  For Air Conditioning *and* Gravity



# Got only one line out?

(1) AUTOMATIC  
HEATING

(2) AIR  
CONDITIONING

(3) COMMERCIAL  
REFRIGERATION

GET ALL THREE

...TURN TO



**FOR YEAR 'ROUND PROFITS**  
G-E gives you something to  
sell every month in the year.

## PROFITS

from Air Conditioning

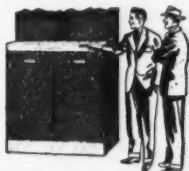


After the heating season, don't hang-up your salesmen—let them jump right into Air Conditioning! G-E gives you a *complete* line for cooling one room or a whole house. And "Packaged Weather" units for air conditioning shops, stores and offices. Winter, summer, and year 'round equipment offers you sales opportunities throughout the year.

And G-E Air Circulators are "naturals" for lower income homes, as well as offices, stores and factories.

## PROFITS

from Automatic Heating

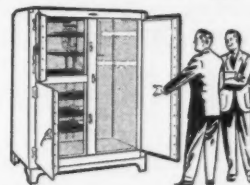


This year General Electric offers you the best heating set-up—the most complete line—in G-E history.

When you're a G-E Dealer you get (1) highest quality heating equipment, (2) complete lines—oil and gas, for radiator or warm air heat, plus an oil burner, (3) a typical General Electric healthy profit set-up, (4) national advertising to soften up your market, (5) local cooperative advertising and dealer promotion material to help you cash in.

## PROFITS

from Commercial Refrigeration



Water Coolers—every type for every need. Bottle Beverage Coolers, Food Storage and Display Cabinets—a complete line to meet the needs of all kinds of business.

In addition: Condensing Units, Cooling Units, Evaporative Condensers, equipment for Walk-in Refrigerators, Locker Storage plants, etc.

Now, as never before, you can count on General Electric for year 'round prospects and profits.

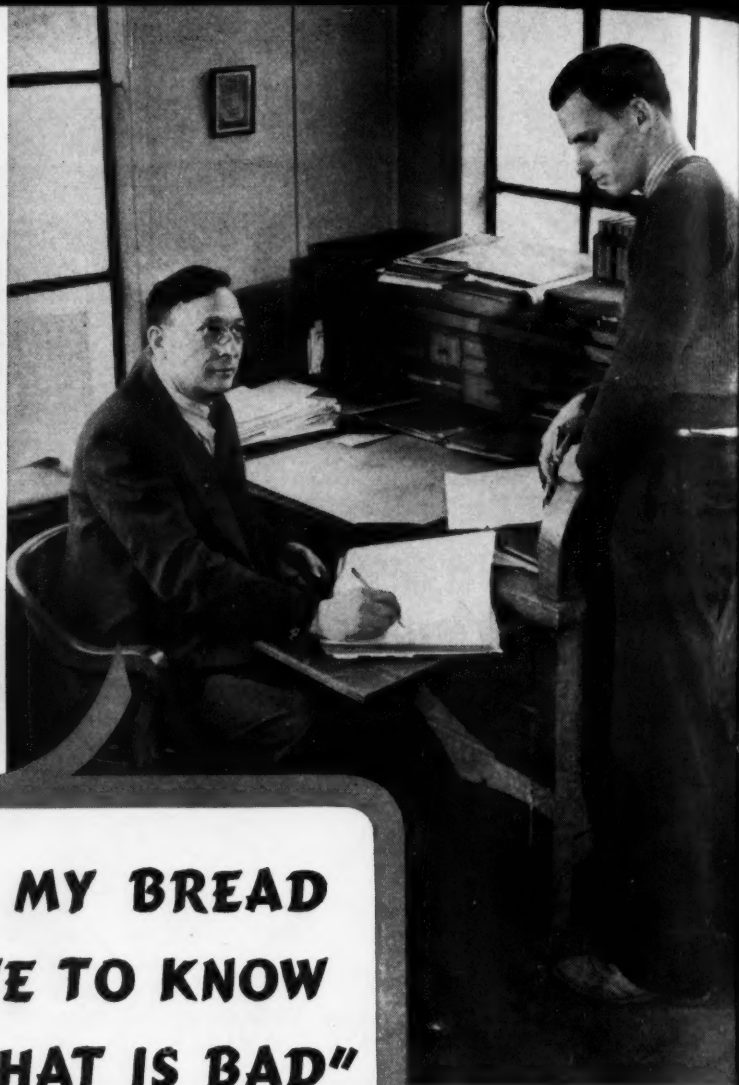
**GENERAL  ELECTRIC**

*Automatic Heating, Air Conditioning and  
Commercial Refrigeration*

GENERAL ELECTRIC COMPANY  
Div. 199-553, Bloomfield, New Jersey

I want details on the new G-E Dealer Franchise for my territory. I am interested in ☐ Automatic Heating ☐ Summer Cooling ☐ Commercial Refrigeration.

Name.....  
Street.....  
City..... State.....



## "SON, SHEET METAL IS MY BREAD AND BUTTER—SO I HAVE TO KNOW WHAT IS GOOD AND WHAT IS BAD"

So says, George Halter, Sr., President,  
Jacob Halter Sons Co., 2604 Walton Ave.,  
Cleveland . . . and then goes on to ex-  
plain one of the reasons for his success  
to his son George, Jr., as follows . . .

*Reading time: 52 seconds*

**Geo., Jr.** "Dad, I notice that Toncan\* Iron is a favorite metal with you. Why?"

**Geo., Sr.** "Son, there are many reasons why I like Toncan Iron. One is its long service life, but more important to me, personally, is Toncan Iron's workability and the fact that its galvanized coating does not flake or crack."

**Son . . .** "How does that help us?"

**Dad . . .** "Well, you know that in these days of competitive bidding, we have to be mighty careful in our figuring and planning to protect our margin of profit. Toncan Iron allows us to figure the cost pretty accurately, whether it's for a large industrial contractor or a home owner, because you'll never find any bad spots in these sheets to slow up our schedule."

**Son . . .** "That reminds me of a remark that Jim made in the shop this morning. He said, 'I never knew of a metal man who had any trouble working with Toncan Iron.'"

**Dad . . .** "Yes, that's very true. And you know how important appearance is today. That's why we use a metal that will let us make tough, intricate bends and still be attractive. That is one reason why non-flaking metal is needed. Right here on my desk, I have a bid for ventilating ducts in a large industrial building on which the contractor wants my personal guarantee that the sheet metal I use will not flake or crack."

**Son . . .** "Gosh, you may lose your shirt on that one."

**Dad . . .** "Oh, no. That is where experience comes in. I know that by using Toncan Iron we can be sure that we won't have any flaking or cracking on the job."

**Son . . .** "You seem to be pretty certain about Toncan Iron."

**Dad . . .** "I should be. I've been in this business all my life and, as far back as I can remember, 20 years, we'll say, during the days when your Grandad was teaching me the tricks of the trade just as I am teaching you now, we have always had some Toncan Iron in the shop."

"During that time, I can truthfully say that we have never had one complaint or reject of this metal. I have proved to the satisfaction of many buyers and to myself that the difference in price between ordinary steel and Toncan Iron is well worth the money. That's why I have never hesitated to recommend Toncan Iron to anybody."

*For literature and the name of the Toncan Iron distributor nearest you — write Republic Steel Corporation, General Offices, Cleveland, Ohio.*

\*Reg. U.S. Pat. Off.

# REPUBLIC TONCAN IRON

An alloy of refined open hearth iron, copper and molybdenum  
—that grows old slowly



BERGER MANUFACTURING DIVISION  
NILES STEEL PRODUCTS DIVISION  
STEEL AND TUBES DIVISION  
UNION DRAWN STEEL DIVISION  
TRUSCON STEEL COMPANY



# American ARTISAN

Vol. 109

No. 5



## The 1940 Cooling Season

As in former years, the summer issues (May to September) of AMERICAN ARTISAN will devote most of the Residential Air Condition Section space to matters pertaining to cooling. During these months we plan to give particular attention to attic ventilation, to engineering for cooling, and to descriptions of unusual and interesting cooling installations.

The first attic ventilation articles appear in this issue. Emphasis, this season, will be laid on merchandising. We plan to emphasize selling because the "engineering" of attic ventilation has been thoroughly standardized and new engineering developments seem quite remote.

Reports indicate that attic ventilation in the South has more than fulfilled the expectations held for it. Farther north, however, attic ventilation or night air cooling has not made the advances expected, probably because the merits of the idea have not had the very real stimulation afforded down south where days get really hot and the summer season is very long.

Nevertheless, attic ventilation is making real progress in the north. More and more utility companies are setting up sales campaigns. More and more contractors are finding in attic ventilation a real solution to the "summer slump." The benefits are so obvious once understood; the installation is so reasonable in first cost and operating cost; owners have found the idea so meritorious—that attic ventilation is bound to progress as time goes on.

What is needed, now, it seems, is selling pressure. The idea behind attic ventilation is so sound, fundamentally, that night air cooling needs no greater selling effort than warm air heating. Both warm air heating in winter and heat effect alleviation by ventilation in summer are basic necessities. Being a basic need, it should be as easy to sell one as the other.

Why more sales, up North, have not been made, seems to be one of the really interesting problems of the 1930's. Sales should not be permitted to remain one of the problems of the 1940's.

Since it seems to be a fact that more and more contractors are devoting their time to sales and

management and hiring mechanics to work with the tools, we suggest that these sales-minded contractors consider carefully the merits of attic ventilation—night air cooling as "something to sell in the summer."

The selling campaigns reported in AMERICAN ARTISAN in the summers of 1938 and 1939 and to be reported this coming summer show completely how direct mail, personalized letters, canvassers, advertising cooperatively, and straight personal selling can be tied together to make up a sales-getting campaign.

Why not make 1940 an attic ventilating-night air cooling banner season?

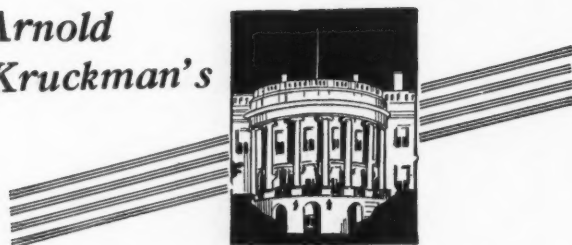
## Bookkeeping in the 1940 Manner

Beginning with the June issue, AMERICAN ARTISAN will once again delve into the problems of bookkeeping. During the Summer and Fall a series will be published discussing bookkeeping needs for the business requirements of 1940. The author will be Joseph G. Dingle, Ottawa, Ill., C.P.A., and author of AMERICAN ARTISAN's other series in 1930 and 1931.

The purpose of this new series will be to develop a bookkeeping system in step with 1940 requirements. While bookkeeping forms have been pretty standardized for two hundred years and are likely to follow double entry or single entry for many years to come, we realize that all the new taxes which must be kept track of and today's requirement of short period balances from which reports can be prepared at a moment's notice are radically different from the time when a man's business was no one's affair but his own.

Suitable forms will be made available. The complete system will be aimed at the contractor who keeps his own books in his spare time and for the medium sized shop where one office girl does bookkeeping along with dozens of other duties. The system, it is expected, will make bookkeeping for 1940 requirements an interesting study. Before the articles get under full speed we welcome suggestions on problems which need special attention.

Arnold  
Kruckman's



## Washington Letter

### The Baltimore Plan

THE Home Owners Loan Corporation is doing its bit to create business for the construction industry in a unique and unusual manner. It has taken an area in Baltimore and turned it into a sort of test tube to evolve a method which may be used elsewhere widely throughout the country. At least theoretically the Baltimore area is "across the tracks." The neighborhood has fine old homes which are slightly down at the heel. They need new gutters, new roofing, internal and external rehabilitation. The presumption is that if these repairs are made they will save the neighborhood from incipient decay. And, incidentally, the business will bring jobs to local workers and to local shops and local merchants.

The Government, via any one of several agencies, will arrange the credit that will provide the money to put in new gutters, to make any repairs to the chimney, to the furnace, and even put in ventilating fans and furnish air-conditioning. The plan is put into operation by a series of committees that have a remote similarity to the "cells" of Europe. There is a general Committee of eminent citizens. Under them are other Committees, headed by the various individuals who compose the main Committee.

The other Committees include men and women who live in the area, or in the block. These Committees again are subdivided into Committees having certain tasks and purposes. One Committee is responsible for making a survey for certain types of deficiencies in the neighborhood houses; another looks for other needs. Still another appraises the neighborhood residents themselves. And there are Committees that act as a clearing house for the information assembled by the working Committees; and other Committees are armed with the information provided by the clearing

house Committees and go forth and call upon the people who own the homes or the buildings that require the rehabilitation.

They visit their neighbors. They tell them about the drive. They sell them the idea of rehabilitation, and show them how they can get the money to make the necessary repairs or improvements. They even help them to find the best local shops that can do the job. The whole point of the plan is to inspire the other fellow to do the thing that you are doing. You lead him to make his repairs because you are doing it and because the man next door is doing it and the neighbor across the street is doing it. You make him see he is helping the man who owns the shop down the street to get some new business that will make the whole area more prosperous.

### Uncle Sam's Money

And back of all of this stands Uncle Sam ready to advance the money to respectable, earnest home owners. After the bugs have been eliminated in the plan during its test in Baltimore it is to be put into operation all over the United States. It is understood several Southern cities are waiting to begin; and that it is to be initiated in Buffalo. The HOLC does not go out and sell the idea to the various communities. The community must signify that it wishes the Government to cooperate in giving the momentum. However, there are a large list of cities waiting for the word to begin.

In order to make the country conscious of these opportunities, and of other opportunities to secure Federal Government support in modernizing old homes and building new ones, eleven major agencies, principal parts of the Government, combined to propagandize the idea in a vast national radio sales campaign. Through April, May and part of June, under

the direction of the experts of the U. S. Office of Education, gifted and outstanding publicists, mobilized from all sections of the nation, will make a series of weekly broadcasts over more than 100 CBS stations, with the chief purpose of persuading listeners to use Government financing for rehabilitation and building of homes. The appeal is particularly designed to reach families with incomes ranging from \$1,000 to \$10,000 a year. Business men and others who wish to aid the campaign may secure booklets, scripts and other material which they may use or distribute. The material is to be had from the U. S. Office of Education, in Washington.

### New WPA Plans

The slightly minus billion dollars Congress has provided for expenditure before the November elections is to be invested by the WPA chiefly in projects that make labor-hours of work. Under the Law the worker is supposed to receive an average of \$55 per month. Administrative expenses are limited to \$2 per man per month, and the expenditure for materials is limited to a maximum of \$6 per man per month. It is also provided, legally, that local sponsors of projects, meaning counties, cities, towns, States, etc., must contribute a sum equal to at least 25 per cent of the amount expended by the Federal Government. There is no limit to the amount that the sponsors may spend on materials.

### WPA Not Competitive

The WPA people emphasize that none of their projects may compete with any regular building or construction projects that involve special types of materials or skilled workers. WPA says that whenever the services of craftsmen are required on public work of any kind the government becomes the buyer and must let by contract and buy in the market. In such public building enterprises they say the Government is restricted by the same laws, such as the Walsh-Healy Act, that govern the hours and wages of public contracts.

WPA earnestly wishes to impress upon the curious that their chief object is to spend their funds on public jobs such as road building that are accomplished solely by labor, and chiefly by unskilled labor. The WPA leaders feel that their principal opposition comes from the Associated General Contractors of America. This organization, concerned largely with heavy construction, has proposed that WPA projects should be limited to operations that would not cost

(Continued on page 94)



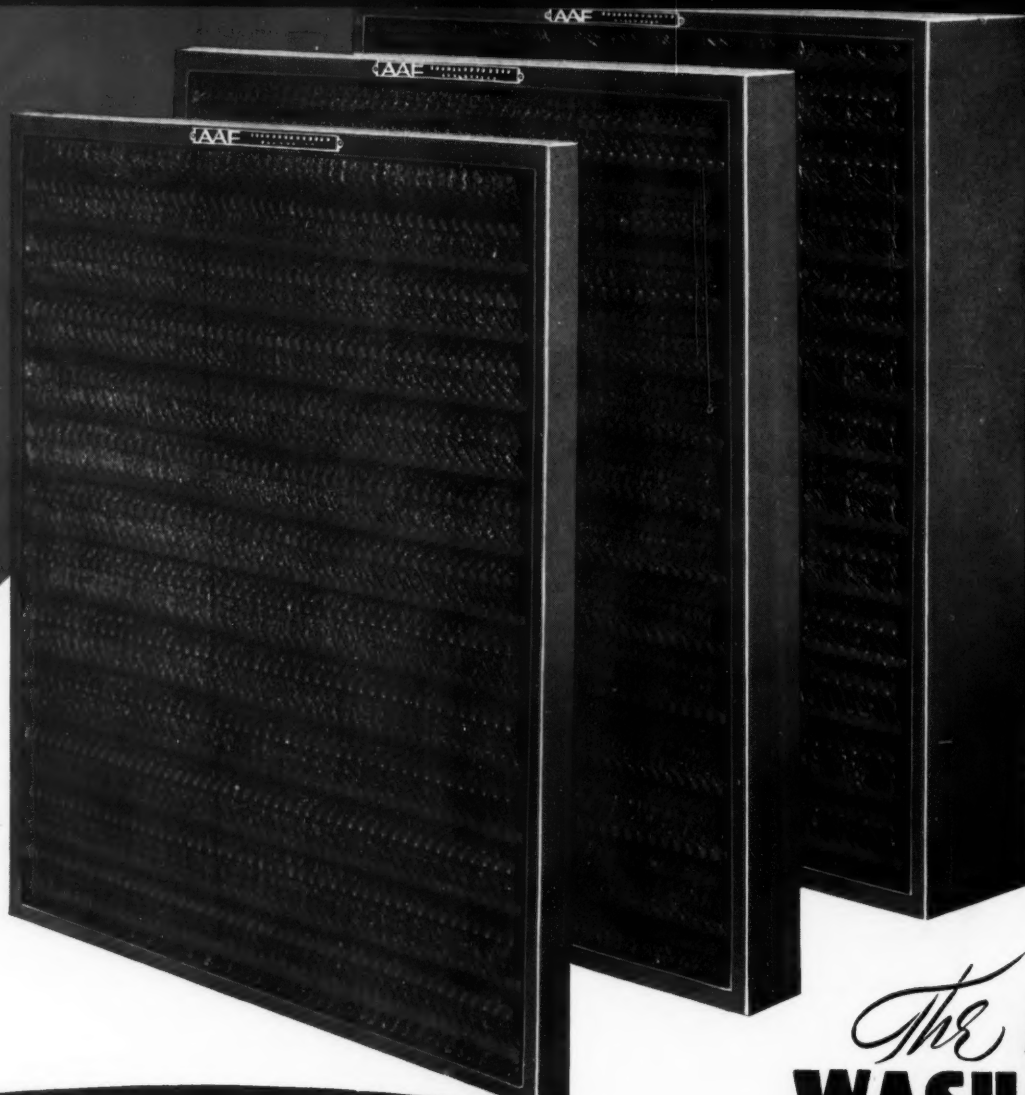
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AT  
LOW COST!**

*The* **A-C**  
**WASHABLE**  
*Permanent* **TYPE**  
**FILTER**

Furnished in 3 thicknesses, 1", 2" and 4".  
The 1" and 2" cells without frames are avail-  
able in standard sizes and can be made to  
order in special sizes for unit air condition-  
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American Type A-C Filters were designed for use in unit air conditioners and warm air conditioning units where filters with washable features are desirable and the dust conditions are not abnormally severe. The outstanding features of the A-C Filter as compared to renewable types are its greater dust storage capacity and low maintenance cost coupled with higher cleaning efficiency. The special construction of the herring bone baffles enable the A-C filter to collect a considerable volume of dust and lint without restricting air passages or increasing air flow resistance. The finer dust particles are collected by successive layers of knitted galvanized wire mesh.

Here is real quality at amazingly low cost for no other filter on the market has as great dust holding capacity per square inch of area surface as the A-C filter.

Cleaning is simply handled by first tapping out most of the dirt and then washing under a hot water faucet. After being coated with Viscodine, the filter is ready for service. Engineering data and installation details helpful in installing the A-C Air Filter are given in Bulletin No. 67. Write for your copy!



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620 CENTRAL AVENUE, LOUISVILLE, KENTUCKY



# Engineering is the "Key" to Buyer Confidence

By Henriette T. Betlem

Betlem Heating Co., Rochester, N. Y.



THE success of any business depends on its sales. And in the air conditioning business the success of the sale depends greatly on the engineer, for it is the engineer who plans the installation and determines the requirements for the job.

The first important step in turning a prospect into a sale is often made by the engineer during the survey. Therefore, the better salesman the engineer is, the easier it becomes to get the order.

There are, generally speaking, two classifications of air conditioning prospects: the small concern, where we deal directly with the owner and buyer; and the large establishment, where we work with the chief engineer, the purchasing agent, or with some other person who is in a position to determine the type of equipment which should be purchased but is not in authority to award the order. In each case, however, the person the engineer interviews is probably the deciding factor in the sale.

It is during the survey that the first evidence of engineers' sales ability is displayed. An adroit engineer can cause the buyer to reveal considerable information which will be useful in closing the sale, or in uncovering further prospects.

We were recently called in to estimate a price for air conditioning in a suite of offices. Several other concerns bid the job as directed by the purchaser. Closer interrogation on our part revealed that the purchaser wanted winter ventilation, humidity, and good air distribution more than comfort cooling. Our price on the winter air conditioning alone was more than our competitors' price on comfort cooling. When the facts were presented to the buyer he was indignant that our competitors thought he would have been satisfied with an inferior type of job and refused to let them submit further quotations. In addition to giving us the office job on cooling and ventilation, he asked for figures on ventilating the factory space.



The restaurant (right) was "sold" because the engineer recommended a false ceiling for duct concealment, eliminating exposed ducts. The radio studio (above) was so well engineered that two additional jobs were secured.



Although competitive figures on this installation were based on using several high speed exhaust fans, careful questioning as to the permissible noise level revealed that noise was a most important factor. There are many women working in the plant and a high noise level would be detrimental to their efficiency. So, again, at a higher price we quoted on the use of centrifugal fans at lower speeds for the exhaust system and received the order.

#### Buyer's Confidence Is Essential

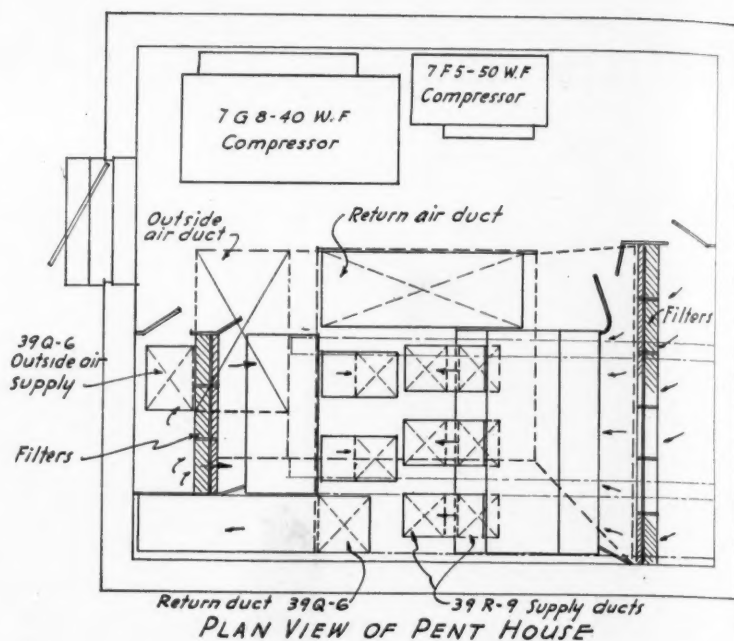
Pertinent information is by no means the only sales help the engineer can offer. There is something more vital and lasting—the buyer's confidence. Once you have that, the buyer will become a salesman for you. If he can appreciate how thorough you are and what deep interest you can express in his particular problem you can win his lasting confidence right there.

A few years ago we were asked to bid on some ventilating work for a large manufacturing concern. The work involved ventilating one large wing in the factory and cooling a small part of it. The equipment location allotted was the penthouse of an unused elevator shaft. In this restricted space we had to locate three air handling units, two handling 8,000 feet each and one handling 4,000 feet; a double bank of filters for each unit; and a five horsepower compressor for the cooling; leaving space for a future 40-horsepower machine.

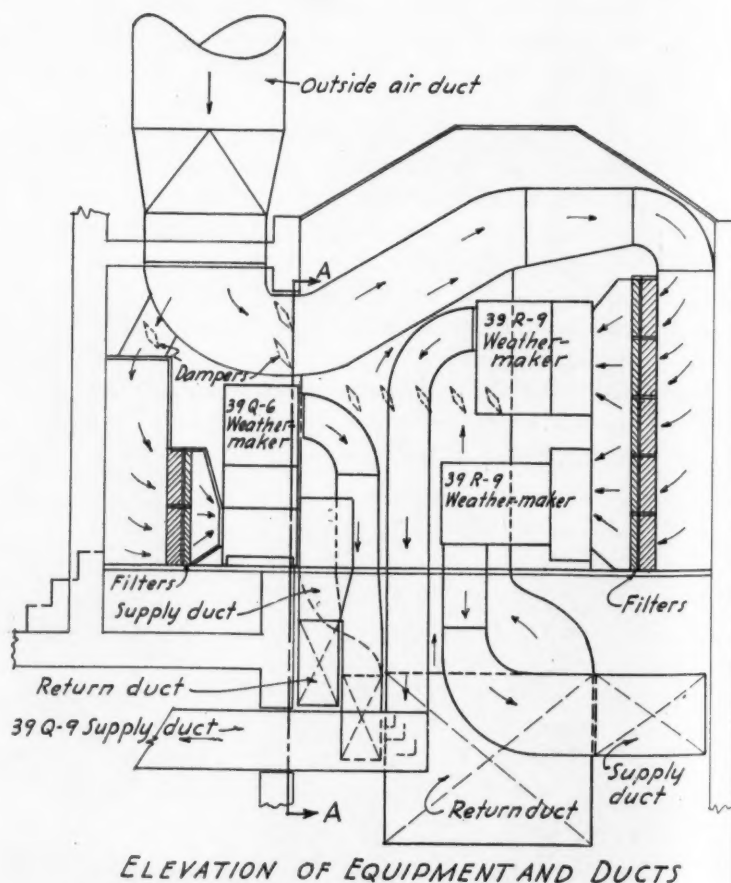
#### Questions Inspire Confidence

All the selling we could do to obtain that job was the impression we could make on the construction engineer who accompanied us during the survey. And the only entry we had to the factory was for the purpose of making the survey. We spent several hours on many different days checking and rechecking every detail. We poked into all corners of the space to be conditioned. We asked untold questions about the process of manufacture to determine just what temperatures were necessary for best manufacturing conditions. Before we had finished the survey, the construction engineers of the plant were thoroughly sold on our ability to do a good job.

From there on the decision which would give the job to us or our competitors was out of our hands. The person making the decision, however, would be influenced by his engineers and—the proposal and blue prints. Here again, the engineer can do unobtrusive selling. The blue print we submitted for this job was complete to the last detail. Hours had been spent in perfecting it and making it positive proof to the purchaser that we knew our business. (The blue print for this particular installation was so complicated



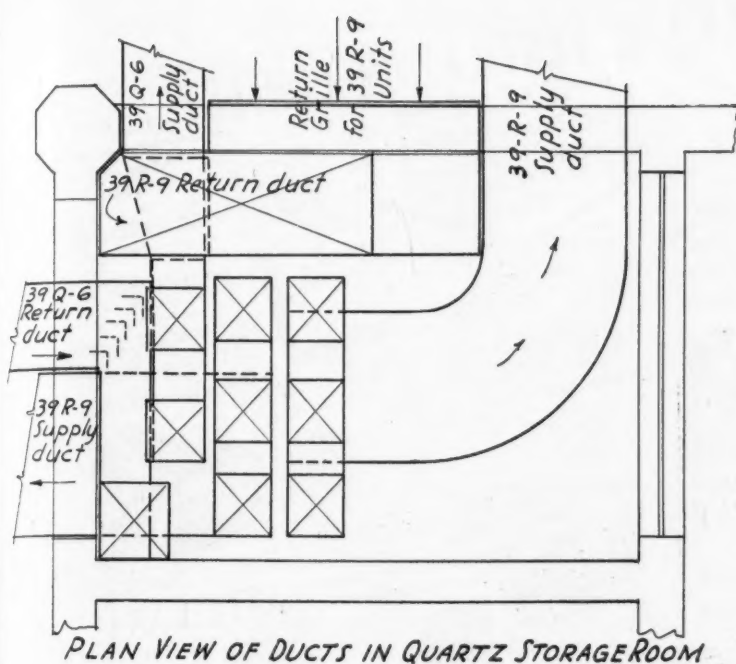
Showing two suspended Carrier Weathermakers without cooling coils handling 8,000 cfm each and one vertical unit without cooling coil handling 4,000 cfm.



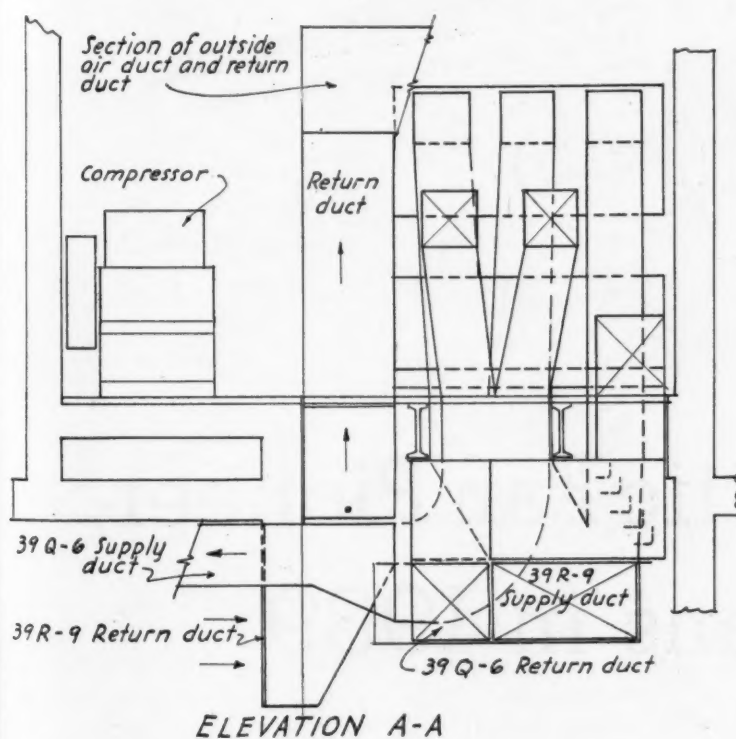
Penthouse of unused elevator shaft showing cross section of air handling units, double bank of filters and ducts. First section filters of cleanable type; second section replaceable type. First filters remove very fine particles; second section removes lint.

that, picking it up a few years later, I could hardly follow it myself, but the impression made at the time was most effective.)





This room is used for storage of raw material and adjoins rooms supplied with special filtration and ventilation.



Another cross section of equipment room. The customer was not convinced all needed equipment could be placed here until detailed drawings were submitted.

There was no doubt left in the minds of all people there concerned with the purchase of air conditioning equipment who was to get the order. After a few more jobs, which we bid competitively and received, we were no longer forced to compete with other concerns for the business.

Now, we are called in to give a budget estimate and when that has gone through for approval we submit a final price and are notified a few weeks later to proceed with the installation. We have received thousands of dollars' worth of business from this concern every year and during all this time have never discussed a prospective installation with the purchaser. In other words, we feel that our engineering is our greatest sales asset.

#### Plans of Two Case Examples

Effective engineering was also responsible for the sale of both of the jobs shown in the photographs. The restaurant installation was awarded to us despite the fact that the owner had previously awarded a similar contract in another town to a competitive organization and that we were not low bidders.

Our survey showed just enough space above the false ceiling to conceal ducts and we built up the outlets as shown to eliminate any exposed ducts in the conditioned space. This installation was made before ceiling outlets were on the market.

The radio studio shown is cooled with a 3-HP compressor and an air conditioning unit handling 2,000 feet of air. This one job led to the sale of two more systems, one for the main studios and a winter air conditioning system for a transmitter station. Clever selling alone might have given us the first contract, but fulfilling the guarantees made possible the succeeding installations.

#### Specialty Sales a Different Field

Of course, this type of selling applies chiefly to the contracting type of business. Specialty selling is an entirely different field, and when it is just a question of bidding your unit against those of your many competitors, an engineer who is not also an extremely good salesman is at a distinct disadvantage. However, it might be easier to train an engineer to sell than it would be to force a man, unmechanically minded, to grasp the engineering details of equipment and installations which would aid him in making sales. We feel that it is absolutely necessary for a salesman in the air conditioning business to know engineering.

Our experience shows that, even if it is specialty selling, in order to sell satisfied customers you must understand their needs. Selling them on your product may create a flurry of business or the requisite amount of commissions for the salesman, but if you don't sell them what they need, you do not have a successful installation. The more satisfied customers we have, the easier it becomes to get more business. And that is the prime reason for conducting a business.

Play up to the importance of your engineering and dramatize it in your sales presentation.





grief arising from price-cutting competition. In fact, on a large number of the important jobs we have obtained in the past, Way has been the highest bidder, instead of the lowest. The jobs went to us because the customers knew of our excellent record based on past performance."

#### Basic Engineering Principles

The basic engineering principles are, today, largely standardized, Mr. Way says. In residential structures, the size of the fan is based on an approximate air change of 60 times per hour. In commercial installations, air change may run to 1½ times to 2 times per minute.

Way recommends that the grille be located as near the center of the house as possible and this usually proves to be the hallway. Never, as a rule, are several grilles placed in several rooms; the central hallway grille being the preferred practice. Grilles are sized to permit 500 feet per minute velocity through the grille.

As to the method of exhausting the air from the



fan, the fan is not connected directly to the outdoors, but is arranged to blow the air into the attic, permitting the air to escape as it will. Also, it is not Way's custom to construct complete duct systems from grilles to fans to outdoors.

The importance of engineering out vibration and noise is recognized, and various makers have suggested a wide range of methods to insure quiet operation. One fan is mounted in springs; another is mounted on cork; another is cushioned in rubber, yet another employs felt pads to deaden noise and vibration. Also, all fans are connected to the box with canvas connections to eliminate vibration between the fan and the house, and rubber cushions are standard with most motor manufacturers. Way has used practically all these ideas, found them good, and uses the method suggested by the manufacturer of the fan being installed.

Houston regulations do not require the contractor to make any provision for automatic fire



dampers and, as a rule, no provision is made for them in Houston.

Way Engineering builds its own fan housing. The superstructure is constructed of insulating board, with 2 by 2-inch framing on the outside, making the box smooth inside. The fan is suspended in a wood frame, and is placed about 5 to 10 feet away from the grille. Various ways have been devised for shutting off the box in winter time or when the fan is out of use. Two favorite Way ideas are the drop door grille; another is the automatic louvre, which opens and shuts as the fan is turned on and turned off, plus an automatic door on the front of the fan.

As an added convenience to the purchaser, Way has been installing a time clock, which turns off the fan at 2 o'clock in the morning, or any other

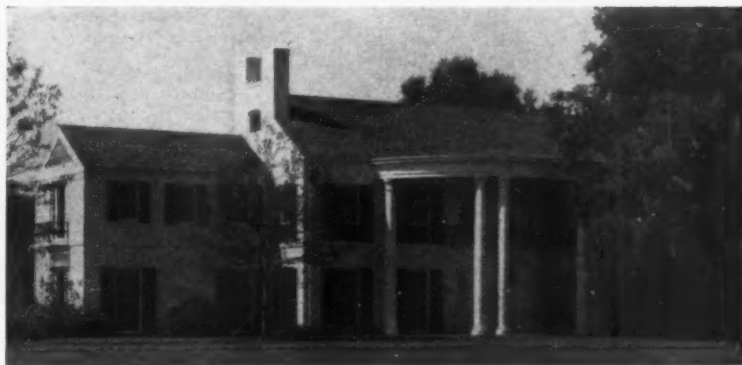
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Attic ventilation is readily accepted by owners of Houston's finest homes. The three on this page are typical of Way sales. Note obscure louvred openings from attics in these fine houses.

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pre-determined time, when the cool morning air provides sufficient comfort in itself without the necessity of forced circulation. This adds only about eight dollars to the cost of the job, and about 90 per cent of the newer customers are including it.

Way handles several makes of fans including American Coolair, the Bar-Brook, the Gulf Breeze, the Murray and the American Blower. Fairly large stocks are carried—approximately 50 fans, ranging in 12 different sizes.



The company employs six salesmen, who anticipate a fine selling season during 1940. Incidentally, the local electric utility, the Houston Lighting and Power Company, after an exhaustive survey, forecasts a \$485,000 market in Houston for 1940 residential attic ventilation sales.

In 1938, the Way Engineering Company sold 350 fans, and 400 were sold in 1939. These sales were obtained in part by vigorous advertising in the newspaper, on the radio, by direct mail, by circulars, envelope stuffers, hand-out literature, home shows and the display of miniature models.

Next to leads furnished by satisfied customers, Way finds spot announcements on the radio to be the most productive form of advertising. During

the active season, from about May to September, they run an average of 7 of these spot radio announcements per day.

They find Home Shows and similar events, to be quite productive of results, provided the shows are held at the proper time of year, and provided they are not held too frequently.

At this writing (the middle of April) the firm has not yet reached its peak in sales promotion, but, so far as they now know, they will again look to radio as their major advertising medium. Earlier this year they tried one promotional plan—the Consumers Buyers Campaign—but with indifferent results.

(Continued on page 76)

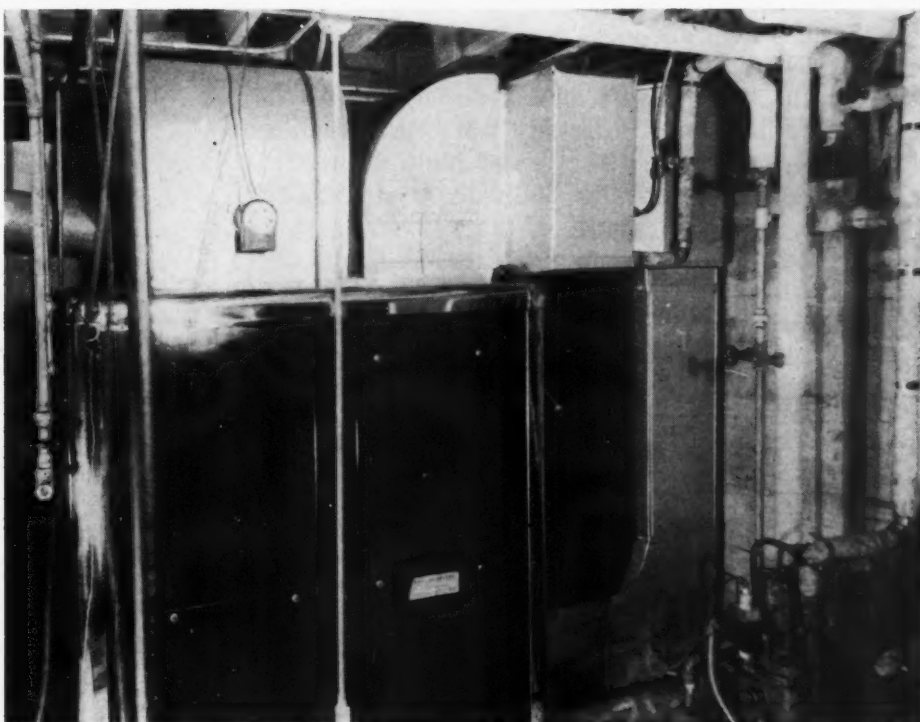
Way believes in making wide and generous distribution of fan manufacturers' literature. These typical pieces—super-imposed one on another—are typical. Way finds this literature is a definite sales help.





Fig. 1—Left—Exterior of the small office building showing summer exposure and roof area.

Fig. 2—Below—The winter heating and summer cooling system. Compare with drawing following. Cooling coil is in box in the return line. In winter air flows through the drop to the blower, by-passing the cooling coil.



## Case Study No. 2

By S. Konzo  
and  
R. B. Engdahl

Engineering Experiment Station  
University of Illinois

# Summer—Winter Air Conditioning System For a Small Office Building

THE authors of this article have inspected and analyzed several actual systems in Urbana and Champaign, Illinois, in an attempt to find out the conditions existing in the field. For this month a brief description of an unusual installation in a small office building is presented. The authors wish to express their appreciation to Mr. James R. Boers, heating contractor, for his assistance in furnishing the design data for this air conditioning system.

The office building shown in Fig. 1 is located at the Swift Soy Bean Mill in Champaign, Illinois, and is of single story bungalow construction. The side walls consist of brick and tile construction. The winter heat loss based on an 80 deg. F. tem-

perature difference, the use of storm sash, 4-inch insulation in ceiling, and one air change of fresh air per hour, amounted to 66,200 Btu per hr. The heating unit consisted of an oil-burning furnace, as shown in Fig. 2.

### Cooling Load

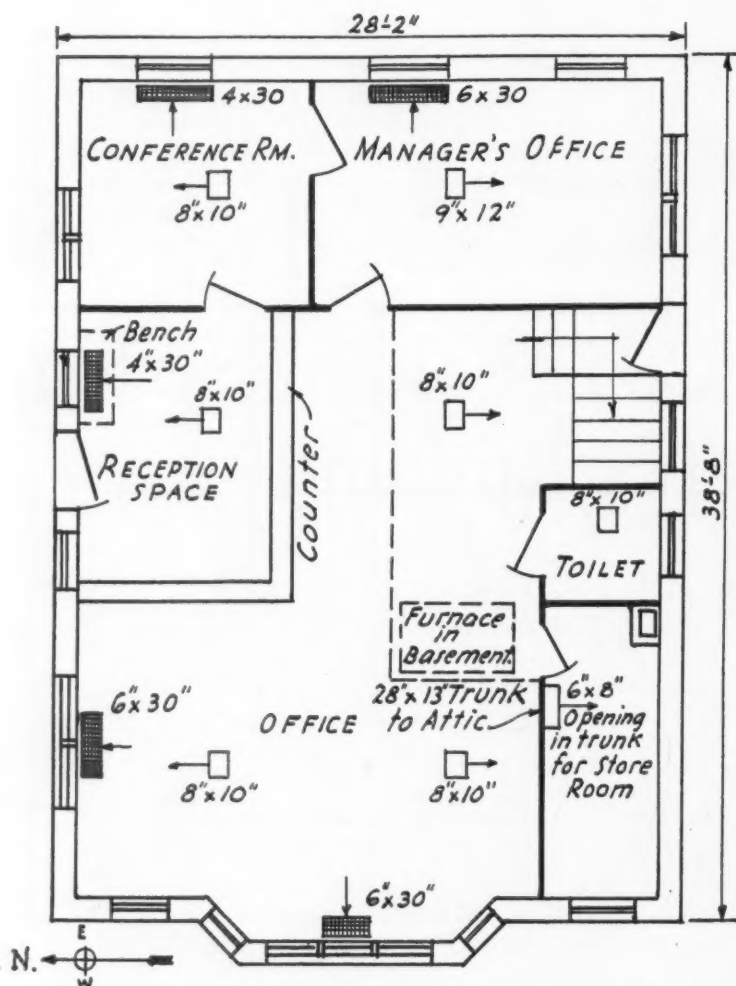
The calculations for the summer heat gain are shown in the accompanying table. The total summer heat gain was 27,890 Btu per hr. and a 3-ton capacity mechanical condensing unit was installed.

A separate fresh air duct was installed with air filters in the duct. Fig. 2 shows the arrangement of the ducts near the furnace, together with the locations of the furnace, the cooling coil and the

condensing unit. The simplified line diagram in Fig. 3 shows the alternate paths for the return air for summer and for winter air conditioning. Two independent room thermostats were used, one to control the furnace and fan for winter heating and the other to control the operation of the condensing unit alone for summer cooling. For summer cooling purposes the fan was operated continuously.

#### Register Location and Duct System

The plans for the air conditioning systems were not called for by the builders until the building was practically completed, the walls were plastered, and the linoleum floor laid. Furthermore, the heating contractor was warned not to disturb the building structure any more than was absolutely necessary. The use of high sidewall registers was practically eliminated by this restriction. As a consequence, the system finally accepted by the builders made use of ceiling outlets for the warm air registers and floor registers for the return grilles. The latter were necessary, since the brick-tile wall construction did not permit baseboard returns. The location of the ceiling



All warm air registers in ceiling. Ceiling height 12 ft.  
All cold air grilles in floor. Basement is unexcavated except for heater room.

Fig. 4 Plan view showing register locations.

#### CALCULATIONS FOR HEAT GAIN

##### Design Conditions

outdoor dry-bulb = 95 deg.  
indoor dry-bulb = 78 deg.  
temperature difference = 17 deg.  
Attic temperature = 105 deg.  
temperature difference through ceiling = 27 deg.

##### Heat Gain Calculations

###### Item 1. Walls not exposed to sun.

area = 658 sq. ft.  
coefficient = 0.30.  
temperature difference = 17 deg.  
Heat gain = 3,355 Btu per hr.

###### Item 2. Walls exposed to sun.

area = 606 sq. ft.  
sun intensity = 100 Btu.  
Emissivity coefficient = 0.8.  
equation used = see University of Illinois Bulletin 290.  
heat gain = 5,520 Btu per hr.

###### Item 3. Windows not exposed to sun.

area = 98 sq. ft.  
coefficient = 1.13.  
T. D. = 17 deg.  
heat gain = 1,880 Btu per hr.

###### Item 4. Windows exposed to sun (all sun exposed windows equipped with awnings.)

area = 186 sq. ft.  
sun intensity = 100.  
awning coefficient = 0.28.  
heat gain = 5,210 Btu per hr.

###### Item 5. Ceiling.

area = 1,000 sq. ft.  
coefficient (4½ in. wool) = 0.06.  
T. D. = 27 deg. (105° - 78°)  
heat gain = 1,620 Btu per hr.

###### Item 6. Ventilating air.

weight circulated = 840 lbs. per hr.  
entering enthalpy = 39.2 Btu per hr.  
leaving enthalpy = 29.8 Btu per hr.  
heat gain = 7,900 Btu per hr.

###### Item 7. Occupancy.

6 persons.  
400 Btu per person.  
heat gain = 2,400 Btu per hr.

###### Item 8. Total.

Total = 27,890 Btu per hr.

Note. This is slightly less than the capacity requirements for a 2½ ton machine. The use of a 3 ton unit will give ample excess capacity for unforeseen contingencies, or for occupancies greater than six people.

For a 15 degree temperature differential for the incoming and the outgoing air, the air requirement for the delivery of 27,900 Btu per hr. equals 1850 cfm. In case the unit actually delivers three tons capacity a larger temperature difference may be maintained.

registers and floor grilles are shown in Fig. 4. A photograph of the main office showing the ceiling registers is shown in Fig. 5.

In order to direct the conditioned air towards the outside walls, as shown by the arrows at the warm air registers in Fig. 4 and to avoid drafts on the heads of the occupants, adjustable deflecting vane registers were installed. When the duct system was being balanced, the vanes in the registers were individually adjusted so that the air did not in any way disturb the occupants when seated or



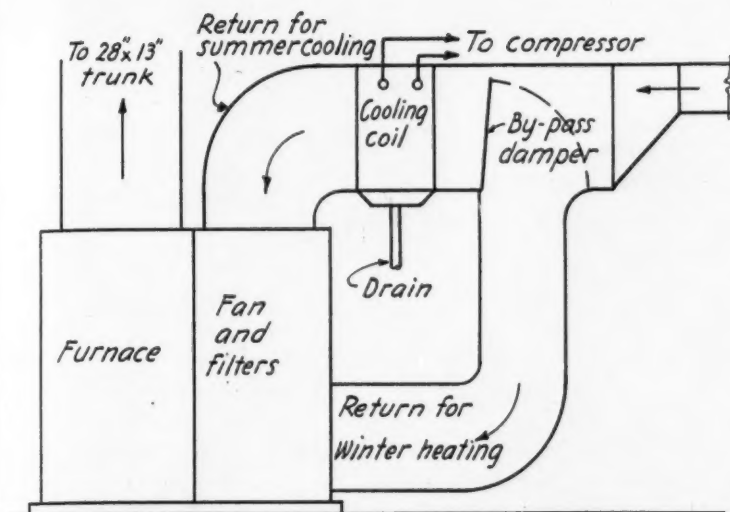


Fig. 3—Line diagram showing duct arrangement at the furnace. Summer air flow and winter air flow are switched by means the manual damper.

standing. The 12-foot ceiling allowed sufficient space for the incoming air to mix with the room air and to diffuse in such a manner that the initial register velocity of 600 ft. per min. was reduced to a negligible air motion in the main living zone. The use of adjustable vane registers in this installation meant all the difference between a satisfactory air conditioning installation and a spotty, drafty job. The system, which has been in use for three summers and four winters, has been entirely satisfactory to the occupants from the standpoint of comfort and lack of objectionable drafts. No changes in damper adjustment are necessary between summer and winter operating conditions.

The warm air supply duct from the basement conditioning unit passed through the store room and entered an enlarged plenum chamber at the top of the stack, to which the ducts leading to the ceiling registers were attached. The ducts in the attic space were wrapped with a 2-inch thickness of mineral wool bat, to reduce the heat transfer from the conditioned air to the attic air. The duct design was based on the Technical Code of the National Warm Air Heating and Air Conditioning Association. The total friction loss for the warm air ducts and return air ducts were both based on a design value of 0.08 in.

#### Same Air Volume for Summer and Winter

It was desirable in this installation to use approximately the same total air volume for summer cooling and for winter heating. For a 15-deg. F. temperature differential for the incoming and outgoing air, the air requirements for a summer cooling load of 27,900 Btu per hr. was 1,850 cu. ft. per min. If a design temperature of 135 deg. F. had been used for the winter register temperature, only 980 cu. ft. of air per min. would

be required to handle the winter heat load of 66,200 Btu per hr. Obviously, this would require two different air volumes, which would require either a two-speed fan or a pulley arrangement that would provide two air deliveries.

In order to avoid these complications, the design of the duct system was based entirely on the summer air volume of 1,850 c.f.m., and the fan capacities were checked with the cooling coil resistance of 0.15 in. added to the resistance of the duct circuit. Calculations indicated that if this same 1,850 c.f.m. were circulated in winter, the average register air temperature would have been 100 deg. F. In view of the fact that proper precautions were observed to avoid drafts, this low register air temperature was not considered as objectionable. As a matter of fact, had there been any complaints due to drafts in winter time resulting from low register air temperatures, the register air temperature could have been increased to a certain extent by raising the setting of the bonnet thermostat. Under certain conditions the increased length of off-periods which might accompany such an adjustment might not give desirable comfort conditions. It does indicate, however, the large range of flexibility in design and operation of a year around air conditioning system which makes it possible to use practically the same air volume for summer and for winter.

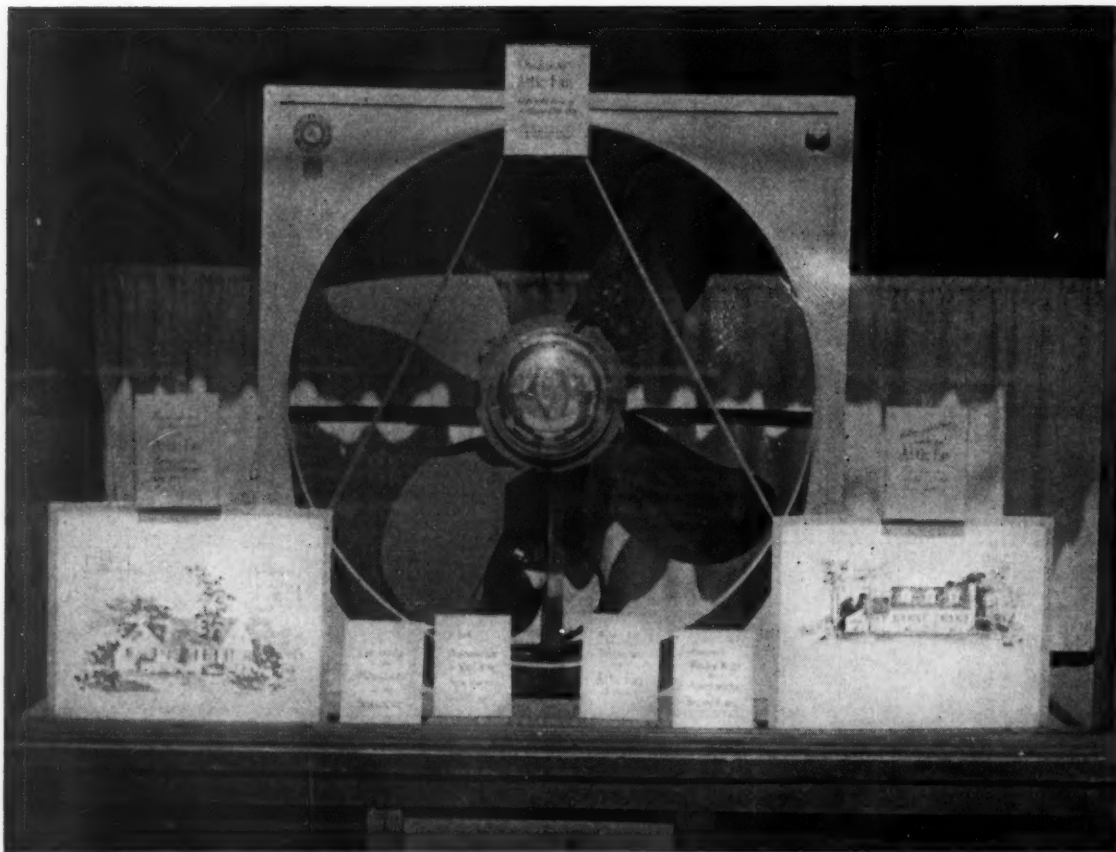
#### Operating Conditions

A record of the servicing calls on the installation shows one call for final damper adjustment, two calls for adjustment of controls on the compressor, and two calls for burner servicing. Regularly each fall the compressor is pumped down

(Continued on page 92)



Fig. 5—General view of office showing ceiling registers. Adjustable, deflecting registers were used to control the direction of air flow and avoid drafts on occupants.



Attic fans, in season, are a major display item in Peerless show windows. So far as possible, show cards explain the "whys" and "effects" of attic ventilation.

## *One Contractor in Three New Jersey Counties Sold*

# 6 Attic Fans in 1936—75 Fans in 1939

By R. C. Nason

"PRACTICALLY every thinking building owner agrees that summer cooling is as desirable as winter heating," states Leslie Lord, manager, Peerless Air Conditioning Co., Maplewood, N. J., whose firm has been signally successful in selling attic ventilation fans to residents of three counties.

Among reasons for the ready acceptance of this appliance, that of moderate cost, as contrasted to refrigerated cooling, is cited as important. "Many persons definitely are convinced of the advantages of summer cooling," points out Mr. Lord, "but when they learn the cost of refrigeration, they just do not sign the orders. When attic fans are offered, the percentage of sales to "tries" proves that attic fans can and are being sold without much difficulty."

"We do not hold the idea that attic fans are

thus offered as cheap substitutes for refrigeration," explains the head of the Peerless organization. "Rather, they are the foundations to the more complete year 'round plants that doubtless will be increasingly popular as time goes on. But, as a baby must crawl before walking, so also must building owners be led up to expensive cooling via the attic fan. The way things are turning out it looks like the attic baby has begun to take definite walking steps in preference to complex systems."

From a modest start of 6 units, three years ago, the Peerless Air Conditioning Co. sold and installed 75 last year and have enough prospects already on the books so that it seems likely sales will be vastly increased during the current season. Form letters and booklet enclosures mailed out to a selected list by the dealer in the spring result



in many inquiries, but unquestionably the best method of making sales is via personal canvassing. In all canvassing—house-to-house and store-to-store—the latter, as likely prospects, certainly should not be overlooked. In fact, it is through making satisfactory installations in a number of local stores that sales have been made by Peerless to home-owners who have witnessed the advantages of cool shopping.

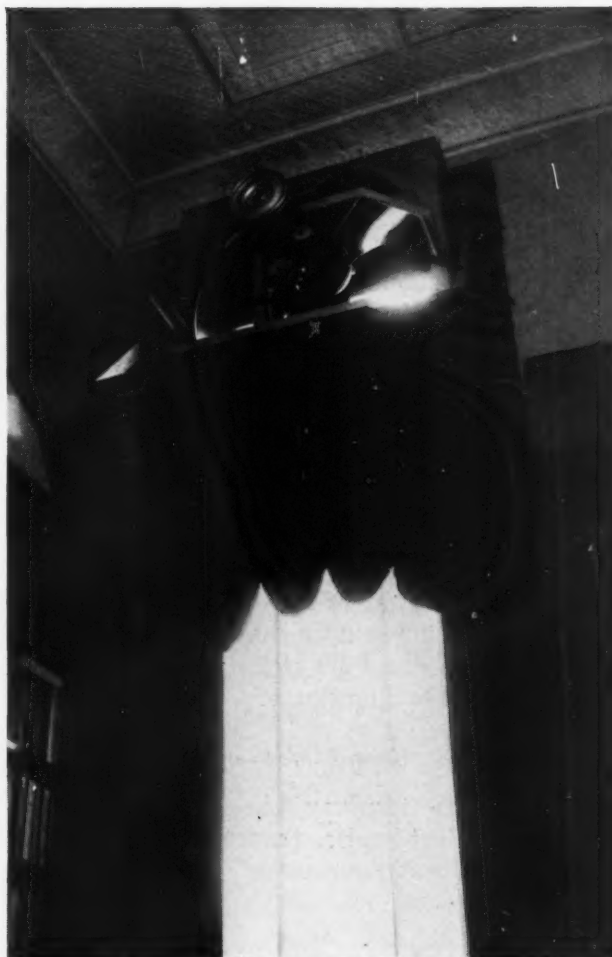
One successful attic ventilating fan installation sells another, emphasizes Mr. Lord. Working on this principle, it is the aim of the Peerless sales force numbering five men, to get working installations into good neighborhoods, preferably with influential citizens; then obtaining additional orders from neighbors, relatives and friends who have seen the fans in service.

#### Good Engineering Essential

Part of the success of this dealer, who also sells warm air heating and air conditioning in all its branches, is recommending attic fans large enough to do a good cooling job. Thus Mr. Lord rarely suggests fans smaller than 30 in. diameter and has installed several 42 in. diameter. Thirty-inch and 36-in. fans prove the most popular sizes. The latter give a two-minute, theoretical air change in a 14,000 cu. ft. building, hence are almost universally recommended by Peerless as first choice.

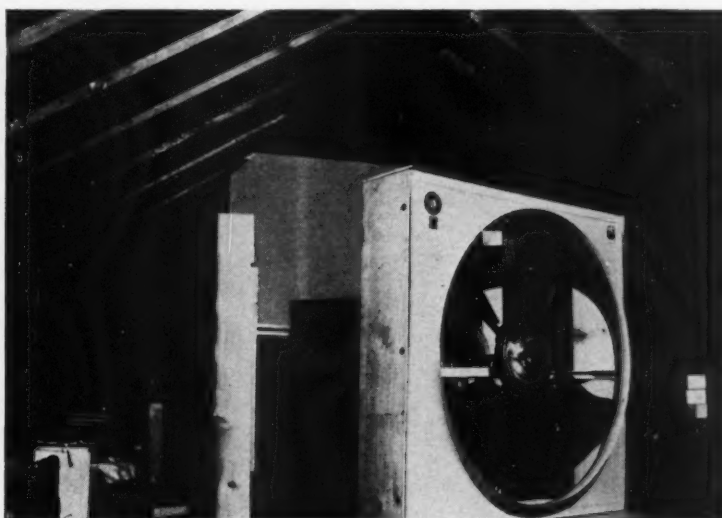
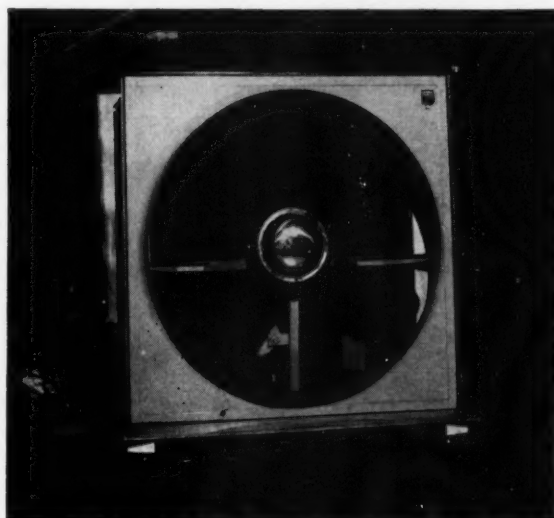
Sometimes unwillingness of owners to stand the cost, forces the use of 30-in. fans. Yet, seldom if ever, have smaller units been installed and Mr. Lord prefers not to make an installation unless he is sure that results will prove satisfactory.

Practice, as to method of installation, varies, usually depending on working conditions, as found. A very common Peerless idea is the use of



Ventilating fans of the attic variety, in public places have a high sales value, Peerless finds. So they try to sell as many to stores as possible. This fan is in a lending library. A card tells who sells this fan.

the attic stairway as intake for the fan. Under this arrangement the fan is placed at the top of the stairs on the attic floor and arranged with a horizontal "box" between the stair opening and the fan intake.



The "rollaway" fan installation is especially practical in Peerless' sales area. The fan is placed at the top of the attic stairs. The fan box lid is hinged. When the owner uses the stairs he pushes up the lid and rolls the fan forward on casters. In unfloored attics a platform can be built for service.

The commonest outlet for the air discharged in Peerless procedure has the fan discharge through louvered areas in the side of the attic building wall. In one installation, here depicted, there are three attic-wall, louvered areas. In another installation inspected there was but a single outlet. Discharge of the fan into the general attic area is the common method of air discharge. By building up an outward pressure the heat exhausted from occupied rooms finds its way out through one or more openings without difficulty.

The insertion of top-floor ceiling grilles is avoided as much as possible, to eliminate cutting and cost, and to avoid the less effective cooling incident to individual room ceiling grilles. If stairwells are not available as fan inlets, the alternative may be to install a large, single grille in the ceiling of the hallway of the top floor. This necessitates leaving upper floor chamber doors open at night. If such doors are closed, individual registers are the only alternative.

#### Noise Elimination

The Peerless Company takes at least two precautions against noise transmission, although most fan motors are noiseless. One precaution is

other cases individual workmanship has appeared preferable. Siding material varies from Masonite, Celotex and like insulating board to 24-gauge galvanized steel. Framing also has varied from 1½ in. by 1½ in. angle iron to 2-in. by 3-in. lumber.

In the installation shown here, the general assembly method is practical, simple and ingenious. To allow the use of the attic, where seasonal clothing and other materials are stored, the Peerless company placed the fan and its frames on casters. This permits moving the fan into working position or pushing it away to allow free use of the stairway.

The "box" for the fan intake was made of 2-in. by 3-in. lumber to which 1-in. insulation board was nailed. The front of the top of the "box" is hinged so that when one wishes to use the stairs the "lid" may be pushed upward to allow plenty of headroom and the fan rolled forward out of the way.

#### Operating Suggestions

In actual operation, Peerless urges customers to keep second-floor windows closed until nearly bedtime. During this time first-floor windows will be open. Thus the air stream passes through

Leslie Lord, proprietor of Peerless Air Conditioning Co., beside his truck and a fan to be delivered to a local house owner. Up-to-the-minute equipment and engineering are keynotes of this firm's activities.



the insertion, under the angle iron frame of the fan ring, five ½-in. rubber slabs 1¼ in. wide by 6 in. long. These prevent any possibility of floor-transmitted sound. Second, when fans are located close to outlet louvers in walls a canvas collar is placed between the fan and the wall to prevent sound transmission down the wall. Fire dampers are not employed except in "Coded" towns.

#### "Rollaway" Stair Fans

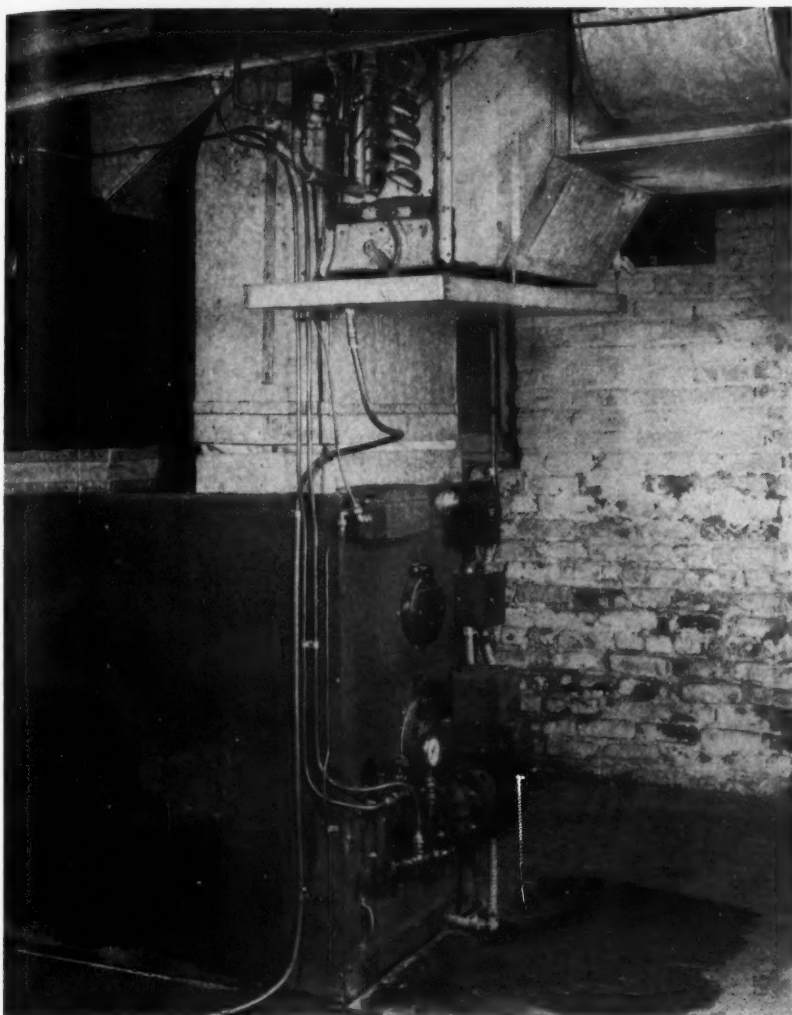
In the construction of housings and fan enclosures, several materials and methods of fabrication have been used. In several cases the fan manufacturer has furnished ready-made housings; in

first-floor windows, up the stairwell and out through the attic. At bedtime first-floor windows are closed and second-floor windows opened. This results in exhaust of heat from this floor and quickly insures a cool house. The full fan capacity is thus applied to one floor at a time.

Peerless also emphasizes one other important point—that buildings cooled at night will keep cool until afternoon provided all windows are closed in the morning. Night air, cooler than daytime air, has been found to bring about definite interior cooling amounting to at least 5 degrees. Sometimes before the sun brings morning heat, say before 10:30 a. m. o'clock, if all windows are

*(Continued on page 104)*





# \$1,000--\$1,300 Year 'Round Air Conditioning System

By F. O. Jordan

Technical Director,  
Industrial Training Institute  
Chicago, Ill.

**T**HERE is summer cooling *and* summer cooling; cooling by means of water sprays, cooling by rapid air change, etc., etc. Then there is the "honest-to-goodness" kind of cooling by genuine refrigeration that is effective under *all* conditions, and not just under certain favorable conditions when we may not need cooling very much, anyway. Just to keep your mind straight on this point, we will start off by telling you this article is a description of an actual installation of adequate cooling by mechanical refrigeration which delivers the goods under the worst conditions when you need cool comfort most.

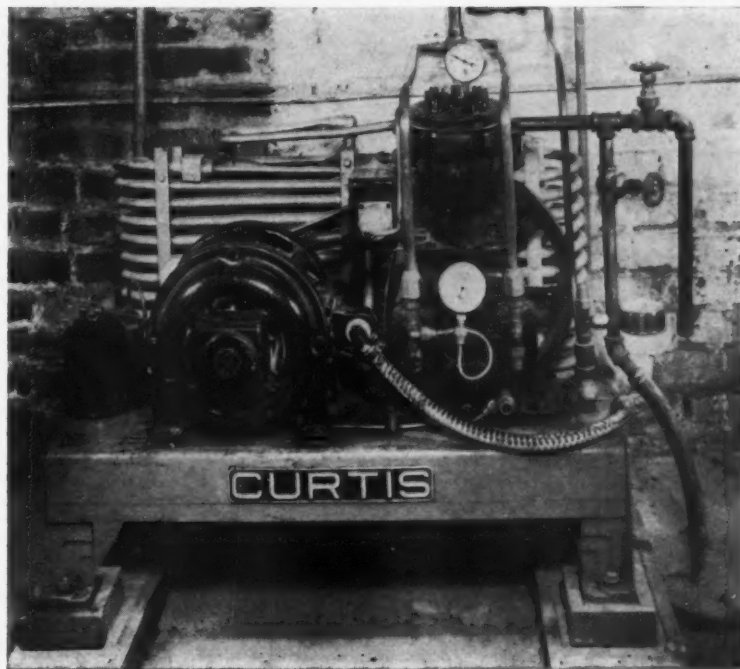
Remember those hot, sweltering nights before the day of summer air conditioning when theatres were empty? But now, the hotter the night the more crowded the theatre. Why? Because summer air conditioning has made people comfortable, regardless of the weather. Everybody knows the answer, and by the same token, everybody wishes he could have a supply of this cool com-

fort on tap in his own home. Then, why isn't summer cooling the general rule in the average home instead of the exception? Any expert will tell you it is because summer cooling is too expensive for the average householder.

Ask the expert how much common people of the type who own modern six or seven room homes will pay for air conditioning. The answer probably will be that the selling price of complete

Above—Fig. 1A—The cooling coil placed in the supply duct of the furnace rather than in the return. This avoids the cooling effect of the furnace casing and the attendant "sweating."

Right—Fig. 1B—The 1½-ton Freon condensing unit cools the Experimental House space studied.



all-year air conditioning, including automatic heat in winter and mechanically refrigerated cooling in summer, must be brought down to around a thousand or twelve-hundred dollars before home owners can be expected to buy in the volume predicted a few years ago. The experts are still hoping for this price, sometime in the future. But in the installation we are about to describe, it is *already here*.

#### Test House and Equipment

The house is an old-time, uninsulated frame structure of the worst type. The occupancy load is unusually heavy for a residence, as it consists of as many as forty students for hours. In fact, the total refrigerating load is equal to the load on an entire average seven-room insulated home, or on an eight-room home if it is well insulated and zoned so that all of the refrigerating effect is used only in the living quarters during the daytime, and in the sleeping quarters at night. Therefore, the costs of this actual installation listed below may be accepted as the cost of a similar installation for a seven or eight-room residence.

A description of the equipment actually installed and now in use is as follows:

**Winter Air-Conditioning Unit.** Conventional, forced-circulation, welded steel furnace of standard make, containing the usual combustion chamber, heat transfer surfaces, high-pressure gun type oil burner complete with controls, air circulating fan, fan motor, air filters, and pan type humidifier. The heating capacity is 100,000 B.t.u.'s per hour at the bonnet, and the air delivery capacity is 800 c.f.m.

**Cooling Coil and Assembly.** Conventional, fin-and-tube, direct-expansion unit with gross face area of 2 sq. ft., 4 tubes deep in direction of air

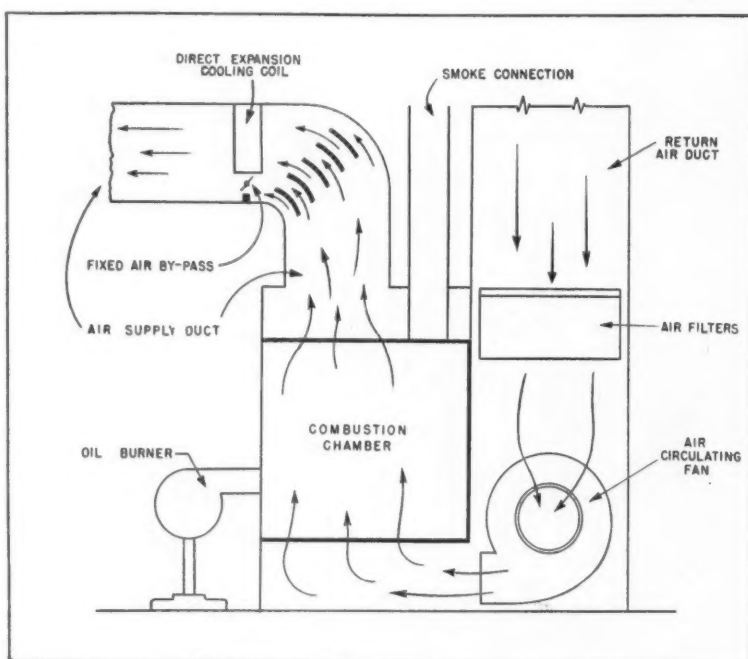


Fig. 2—Experimental house in which the low cost system described is located.

flow, complete with thermostatic expansion valve. The total refrigerating capacity is 18,000 B.t.u.'s per hour at 40° to 45° average refrigerant temperature.

**Condensing Unit.** Conventional, water-cooled, reciprocating Freon-12 unit. The refrigerating capacity is 1½ tons at around 40 lbs., Freon-12 suction pressure.

**Controls.** The controls consist of the usual room thermostat, bonnet thermostat, stack switch, relay, etc. for the heating part of the system and the customary room thermostat, liquid line solenoid valve, thermostatic expansion valve, high-pressure cut-out, low-pressure control, and water-control valve for the cooling equipment.

**Duct System.** The duct system is a conventional trunk line with individual stacks and high wall grilles as shown by Fig. 3.

**Grilles.** Directional type.

**Refrigerant System.** Copper tubing with sweated fittings with inner-and-outer-tube heat-exchanger.

**Water Piping.** Galvanized iron.

**Fuel Oil System.** Copper tubing with sweated fittings.

**Fuel Oil Tank.** Conventional 275-gallon tank, complete with gauge and vent pipe.

Nothing has been omitted to cut the price of this job that could possibly detract from its effectiveness. In fact, it is a complete year-round

Left—Fig. 4—Diagram of furnace unit and the cooling coil in the supply duct. Note the air by-pass below the coil and the manually adjusted bypass damper. Text explains advantages of this arrangement.



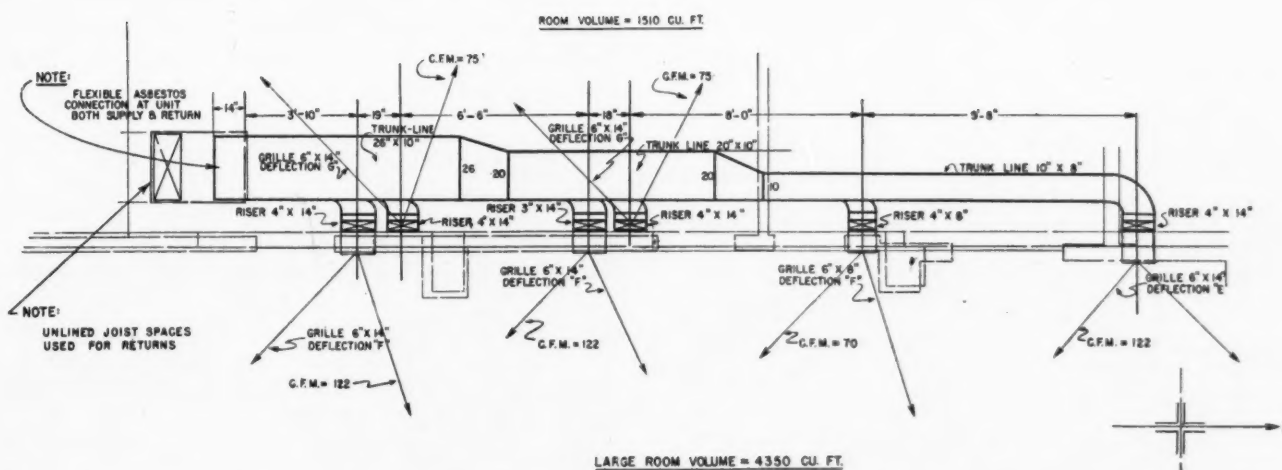


Fig. 3—Duct system in Experimental House basement. All registers are high side wall with horizontal deflection carefully adjusted.

system using the most expensive type of automatic combustion, complete with all usual operating and safety controls, and a complete refrigerating system with all necessary operating and safety controls. The system is fully automatic, as the heating function will be thrown into operation without attention whenever the temperature in the house falls below the setting of the heating thermostat, while the cooling function will be thrown into operation whenever the temperature in the house rises above the setting of the cooling thermostat.

#### Sequence of Operation

The operation of the system is as follows:

When the temperature in the house rises above the setting of the cooling thermostat, the liquid-line solenoid valve is opened, permitting refrigerant to be fed through the thermostat expansion valve to the cooling coil. The rise in suction pressure due to the boiling of liquid refrigerant in the cooling coil throws the compressor into operation through the action of the low-pressure control. When the temperature in the house falls below the setting of the cooling thermostat, the supply of liquid refrigerant to the cooling coil is shut off through the action of the liquid-line solenoid valve. The continued operation of the compressor pumps all liquid refrigerant from the evaporator and lowers the suction pressure until the compressor is thrown out of operation by the low-pressure control. Although a cheaper method would be to start and stop the compressor directly from the thermostat, the control method described above was selected because it eliminates the possibility of excessive refrigerant pressures during off cycles—especially during the heating season—due to liquid remaining in the evaporator.

When the temperature in the house falls below the setting of the heating thermostat, the oil burner is thrown into operation. As soon as the bonnet temperature rises above the setting of the

bonnet thermostat, the air-circulating fan is thrown into operation. When the temperature in the house rises above the setting of the heating thermostat, the oil burner is thrown out of operation. As soon as the bonnet temperature falls below the setting of the bonnet thermostat, the air-circulating fan is thrown out of operation.

With this arrangement, no summer-winter-switch is necessary because the cooling function goes into action automatically whenever it is required, and the heating function automatically goes into action whenever it is needed. Complete safety controls are installed such as ignition failure and limit controls for the oil burner, and high-pressure cut-out and automatic head pressure and water-control valve for the compressor.

Fig. 4 is a diagram of the furnace and cooling coil arrangement. The air-circulating fan in the furnace is used during both the cooling and heating seasons, the air being circulated through the same filters at all times. Although the usual arrangement is to locate the cooling coil at the *entering* side of the fan, we have located it in the air duct *leaving* the furnace. Therefore, no cold air is circulated through the furnace housing. This eliminates the necessity of insulation to prevent loss of refrigerating effect into the basement and rusting out of furnace and housing due to condensation of moisture from the air in the damp basement in the summer. A year's service has convinced us that we have selected the preferable location for the cooling coil.

#### By-Pass With Constant Air Volume

A feature of this installation is that the same fan speed is used summer and winter so that the cost of a variable speed motor and controls is eliminated, even though it is true that more air generally must be circulated through the furnace jacket than through the cooling coil for a given house.

The winter heating load in Btu's per hour on

# COST SCHEDULE No. 1

## Cost of Complete Year-Round Residential Air Conditioning System Installed in Industrial Training Institute Experimental Home

(Equivalent of Seven or Eight-Room Insulated Home of Normal Occupancy)

### OIL FIRED

#### Materials:

Winter air conditioning unit (100,000 Btu output—oil fired).....	\$253.00
Cooling coil and assembly.....	75.00
Condensing unit—1½ ton—water cooled.....	204.50
Duct system installed.....	200.00
Grilles .....	14.00
Cooling thermostat, transformer, solenoid valve and thermostatic expansion valve.....	19.37
Copper tubing and fittings (inner and outer tube heat exchanger).....	9.43
Water pipe .....	.87
Oil tank .....	22.50
Oil gauge .....	1.35
Iron pipe, copper tubing and fittings.....	9.27
Fire Extinguisher .....	6.50

Total material cost.....\$815.79

#### Labor:

Installation of winter air conditioning unit including oil tank—10 man hours at \$1.50..	\$ 15.00
10 man hours, at \$1.00.....	10.00
Installing and charging condensing unit 16 man hours, at \$1.50.....	24.00
Electrical Contract .....	41.00

Total cost of labor for installation.....\$ 90.00

Service Reserve .....

Engineering Expense .....

Total Cost .....\$945.79

a given house generally is three or four times the summer cooling load. This can readily be seen when we remember that the maximum cooling load in a large part of the United States is based upon a differential of 15° between outside and inside temperatures while the heating load is based upon a differential of 80°. Of course, 15° to 30° must be added to the differential in the summer time for surfaces upon which the sun is shining but since the sun cannot shine upon the whole house at the same time, about 10° added to the summer temperature differential is ample. This raises the effective design differential for the entire house to about 25° in the summer to allow for sunshine on the roof. Hence the winter

heating load usually is about  $\frac{80}{25}$ , or 3.2 times the summer cooling load.

On our installation, the heating load is  $\frac{60,000}{18,000}$ , or 3.33 times the cooling load. To do the required latent or dehumidifying work, we use a refrigerant temperature of 40° to 45° in the air-conditioning coil. With the average coil, this results in an air temperature of 50° to 55°, leaving the coil. With a room temperature of 75° to 80°, this

means a temperature differential of about 25°. With an air temperature of 125° leaving the furnace, and a 75° room temperature in winter, we

have a differential of 50°. This means that  $\frac{50}{25}$ , or

twice as much air would be required in summer as in winter if the Btu load were the same. However, the Btu load is 3.33 times greater in winter

than in summer, so that  $\frac{3.33}{2}$ , or 1.66 times as

much air must be circulated through the furnace as through the cooling coil.

Naturally, the ratio of the air circulated through the furnace to the air through the coil will vary with different installations. In some cases more air may be circulated in summer than in winter to obtain a degree of cooling by convection or by drawing in large quantities of outside air in cool weather. In any event, however, the preferable arrangement in the year-round job is to leave a fixed air passageway around the cooling coil so that only the air required by the cooling coil is circulated through it, while the remainder is bypassed. With this arrangement, the fan is operated at the constant speed throughout the year required for delivering the necessary air quantity during the heating season. Therefore, there is no interference with the balancing of the system, and the same air distribution is

# COST SCHEDULE No. 2

## Cost of Complete Year-Round Residential Air Conditioning System Installed in Industrial Training Institute Experimental Home

(Equivalent of Seven or Eight-Room Insulated Home of Normal Occupancy)

### GAS FIRED

#### Materials:

Winter air conditioning unit (110,000 Btu input—gas fired).....	\$165.00
Cooling coil and assembly.....	75.00
Condensing unit—1½ ton—water cooled.....	204.50
Duct system installed.....	200.00
Grilles .....	14.00
Cooling thermostat, transformer, solenoid valve, and thermostatic expansion valve....	19.37
Copper tubing and fittings (inner and outer tube heat exchanger).....	9.43
Water pipe .....	.87
Gas pipe and fittings.....	6.00

Total material cost.....\$694.17

#### Labor:

Installation of winter air conditioning unit 7 man hours, at \$1.50.....	\$10.50
7 man hours, at \$1.00.....	7.00
Installation of condensing unit and charging 16 man hours, at \$1.50.....	24.00
Electrical Contract .....	41.00

Total cost of labor for installation.....\$ 82.50

Service Reserve .....

Engineering Expense .....

Total Cost .....\$816.67



### COST SCHEDULE No. 3

#### Cost of Complete Year-Round Residential Air Conditioning System for 6-Room Insulated House

##### — GAS FIRED —

##### Materials:

Winter air conditioning unit (110,000 Btu input—gas fired).....	\$165.00
Cooling coil and assembly.....	75.00
Condensing unit—1 ton—water cooled.....	160.00
Prefabricated duct system.....	83.00
Grilles .....	21.00
Cooling thermostat, transformer, solenoid valve and thermostatic expansion valve....	19.37
Copper tubing and fittings (inner and outer tube heat exchanger).....	6.46
Water pipe .....	.87
Gas pipe and fittings.....	4.50

Total material cost.....\$535.20

##### Labor:

Installation of winter air conditioning unit	
10 man hours, at \$1.50.....	\$ 15.00
10 man hours, at \$1.00.....	10.00
Installation of prefabricated duct system	
40 man hours, at \$1.50.....	60.00
Installation and charging condensing unit	
16 man hours, at \$1.50.....	24.00
Electrical Contract .....	39.00

Total cost of labor for installation.....\$148.00

Service Reserve .....	25.00
Engineering Expense .....	15.00

Total Cost .....

obtained in all rooms all seasons. Furthermore, the air is delivered to the rooms at a higher temperature during the cooling season than if airflow were reduced with the result that cold drafts are more easily eliminated, and the cost of variable speed motors and starters is eliminated.

#### By-Pass Simplifies Balancing

Another advantage of the air bypass around the cooling coil is that the bypass serves as an initial adjustment for balancing the cooling load on the coil against the refrigerating capacity of the compressor at the desired suction pressure and refrigerant temperature. When the job is first placed in operation the bypass is left wide open so that not enough air passes through the cooling coil to give it the required load. The result is that the refrigerating unit and the cooling coil will balance out at a suction pressure below the required 40 pounds Freon-12. The bypass is then blocked off slowly until enough air is forced through the cooling coil to load it until the suction pressure rises to approximately 40 pounds with entering air at about 75° dry-bulb temperature and 55% relative humidity or any equivalent wet-bulb air temperature. The air bypass is then permanently blocked off at this point.

This installation has had ample opportunity for proving itself, as it has been in use throughout a summer famous for its protracted heat waves,

and the coldest winter recorded for years. During this time, the inside temperature in the summertime has never gone above 78° with 40 students present for several hours, and with several successive days with street temperatures in excess of 100°. During the winter time, uniform temperatures of 75° have been maintained at all times. One of the features is the exceptionally even temperature distribution, largely due to the proper spacing of high wall registers which throw an even blanket of air across the room at the ceiling to flow down over the outside walls and windows, with resulting blanketing of exposed surfaces with cool air in the summer time and warm air in the winter. Horizontal temperature distribution is obtained within one-half degree, while the temperature differential between floor and ceiling is held within 2°. The result is that the same degree of comfort is experienced sitting by an outside window as is found in any other part of the room.

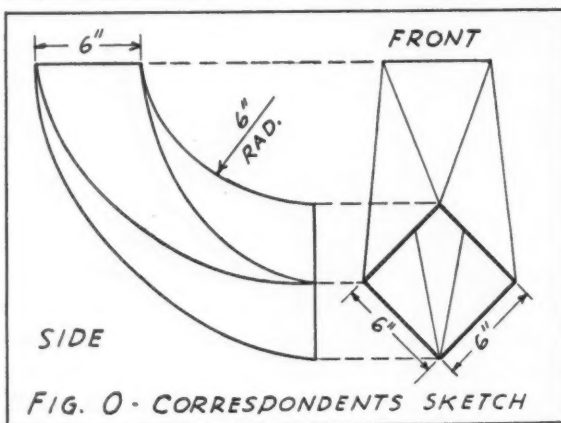
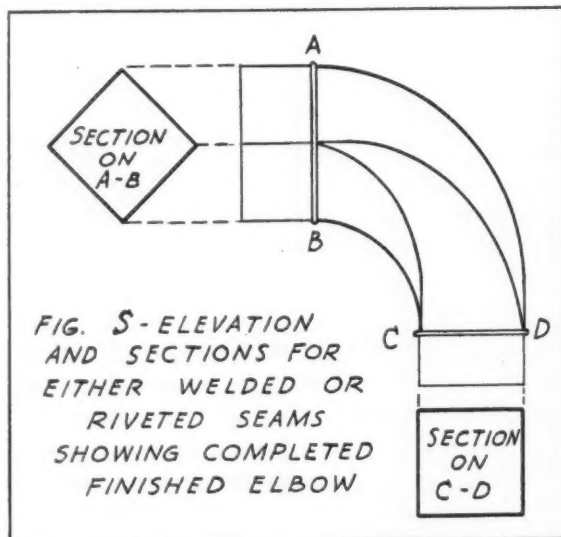
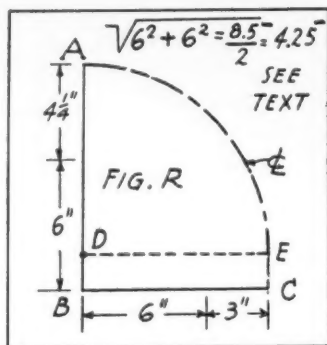
#### Schedules of Cost

Now we are ready for the interesting part of the story—the part dealing with actual costs. The prices upon which the following schedules are based are not special figures, but are actual prices available to any contractor. These prices include all labor and materials—everything but profit and overhead. The profit item to be added is the profit you think the job will carry.

For example, the total installed cost of a year-round system using gas for heating is given as \$816.67 for a seven-room insulated home. (Schedule No. 2.) For an oil-burning, seven-room job, the cost is \$945.79 (Schedule No. 1). The cost price of a year-round gas-burning job for an insulated six-room home is only \$723.20. Therefore, according to the experts, complete year-round air conditioning of the average home should be all ready to go places, because the year-round health and comfort everyone already wishes for his home can actually be purchased for between one thousand and thirteen hundred dollars.

If we zone the building so that all of the cooling capacity can be delivered into the living quarters in the daytime and into the sleeping quarters at night, the 1-ton job will take care of a seven-room insulated home, while the 1½ ton job will handle an ordinary eight-room insulated home. By installing louvred supply registers that can easily be shut off from within the room, the householder can throw the entire capacity into his living room during the occasional bridge party and so keep a whole party of guests comfortable even in hot weather, so that it isn't necessary to figure in a lot of extra capacity even for guests.

(Continued on page 100)



A CORRESPONDENT from Texas writes: "Am enclosing a rough sketch of a duct fitting that is on a job under construction here. Please, if you will, have your draftsman lay out this pattern for me; not by a 'jump rule.' I would like to have it laid out by Triangulation. Also advise whether it could be laid out by the Parallel Line Method."

Our correspondent presents an interesting problem which calls for the patterns for a right angular transition elbow, connecting a vertical square duct to a horizontal square duct placed diagonally. His rough sketch has been reproduced in Fig. O which shows full size dimensions.

Only part of the patterns can be developed by parallel lines, namely, the heel and the throat. The balance of the patterns for this elbow require triangulation for their solution. The true triangulation method for laying out this elbow is shown on the full page drawing in Fig. P. Note that the elbow has been turned in a different position from that shown in our correspon-

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# Pattern Development for Air Conditioning Fittings\*

By William Neubecker

Head Instructor

Sheet Metal Department, New York Trade School

## Angular Transition Elbow

dent's sketch in Fig. O. This changed position was made to facilitate the placing of the true lengths and all the pattern shapes on one drawing as shown in Fig. P.

### Finding Center Line of Curved Elbow

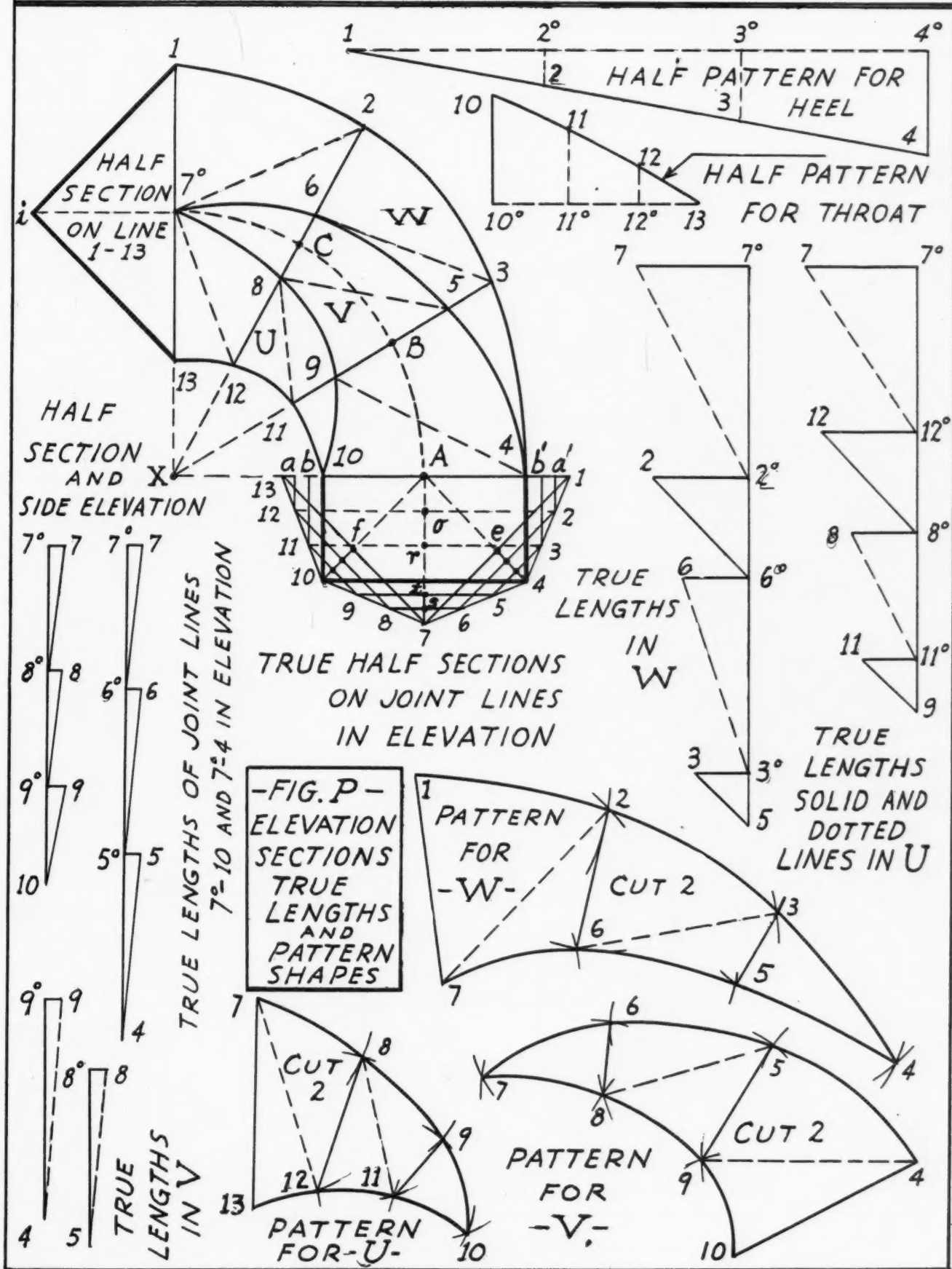
In laying out the pattern shapes, the center line of the elbow must be in a fixed position, as shown by the curved line  $\gamma^\circ$ -A in elevation. We must first know the radius with which to describe this curved center line. In this case in Fig. P it is assumed that the radius for this center line is given, leaving the throat dimensions come as they may. However, if the throat radius is given as shown in our correspondent's sketch in Fig. O, the radius for the center line  $\gamma^\circ$ -A in Fig. P can be found as follows: Assume that the throat radius is to be 6 inches or any other dimension; then simply add the half width of the 6 inch square duct or 3 to the throat radius making the distance from X to A in elevation 9 inches.

To locate the point  $\gamma^\circ$  in elevation requires some computation. To find the length of the diagonal line in a 6 inch square, hold the rule from 6 to 6 on the opposite legs of the steel square and it will measure 8.5 inches. Divide this by two and we have 4.25 inches to be added to the 6 inch throat radius making the distance from X to  $\gamma^\circ$  in elevation 10.25 inches. If desired the length of this diagonal line can be computed as follows:  $6^2 + 6^2 = 72$ .  $\sqrt{72} = 8.48$  or say 8.5. To find the center point for describing the center curve of the elbow refer to the diagram shown in Fig. R which has been shown separately so as to avoid a confusion of lines in the elevation in Fig. P.

Draw any right angle in Fig. R as shown by A-B-C. Set off on A-B the desired 6-inch throat plus one half of the diagonal line or 4.25 inches. On the line B-C set off the 6-inch throat plus one half of the square duct or 3 inches. Take the distance of B-C, the least amount, or 9 inches, and set it off from A to D. Use D as a center and describe the quadrant A-E to intersect the horizontal line drawn from D at E. Draw a line from E to C to complete the elevation of the center



NET PATTERNS FOR RIGHT ANGULAR TRANSITION  
ELBOW, CONNECTING VERTICAL SQUARE DUCT TO  
HORIZONTAL SQUARE DUCT PLACED DIAGONALLY



line of the curved elbow when a given throat radius is desired.

In the development shown in Fig. P the writer has assumed that the radius for the curved center line has been given, leaving the throat dimensions come as they may. First draw any right angle as shown by 1-X-4 in elevation. Establish the distance to the center line as X-A. With X as a center and X-A as radius, describe the quadrant A-7°. Now divide this quadrant in any desired number of divisions, in this case three as shown by B and C.

Through these divisions B and C draw indefinite radial lines to the apex X as shown. Extend the base line X-A as shown by X-1. On either side of A lay off the half width of the square duct shown by 4 and 10. On this line 4-10 draw the half section of the square duct indicated by the heavy outline 4-4-10-10. Now extend the line X-7° as shown by X-1 at the top. On either side of 7° lay off the half width of the diagonal line of the square duct as indicated by 1 and 13. On this line 1-13 draw the half section of the square duct in a diagonal position as shown by the heavy outline 1-1-13.

#### Finding the True Semi-Sections

It now becomes necessary to find the true sections on the radial lines drawn from X through B and C in elevation. In other words, we must find the true sections showing the gradual taper from the half diagonal section at the top to the half square section at the bottom. This is accomplished as follows: Take a tracing of the half diagonal section at the top and place it on the base line as shown by 1-7-13. Now draw lines from 1 to 4 to 7 to 10 to 13. Draw diagonal lines from A to 4 and A to 10 and divide the space between e and 4, also between f and 10, into as many divisions as are shown on the curved center line 7°-A in elevation, in this case three. Through these divisions on e-4 draw lines parallel to 1-7 to intersect the lines 1-4 and 4-7 at 2-3-5 and 6, respectively.

In a similar manner, parallel to 7-13, draw lines through the division points on f-10 to intersect the lines 7-10 and 10-13 at 8-9-11 and 12. In this connection it is proper to say that the sections shown to the right of the line A-7 are similar to those shown to the left. Both sides are shown to make the solution clear.

This completes the true half sections on the joint or miter lines in elevation. In other words, 1-7-13 will be the true half section on the joint line 1-13 in elevation; a'-2-6-8-12-a the true half section on the joint line 2-12 in elevation; b'-3-5-9-11-b the true half section on the joint line 3-11 in elevation and 4-4-10-10 the true half section on the line 4-10 in elevation.

#### True Elevation of Curved Elbow

Having found the true half sections, the next step is to find the longitudinal joint lines shown in elevation by 4-7° and 7°-10, also the outline of the heel line 1-4 and the throat outline 10-13. Points 1 and 13, also 4 and 10 are already located by the half diagonal section of the duct at the top and by the half square section of the duct at the bottom. Now measuring in each and every instance from the center line A-7 in the true half sections, take the projections to points 2-6-8 and 12

and set them off in elevation, measuring in each and every instance from C on the center curved line in elevation and locate points 2-6-8 and 12 on the joint or radial line X-2 previously drawn.

In similar manner again measuring from the center line A-7 in the half sections take the projections to points 3-5-9 and 11 and set them off in elevation, measuring in each instance from B on the curved center line and locate points 3-5-9 and 11 on the joint or radial line X-3 previously drawn. Now trace the heel line in elevation through the points of intersections 1-2-3 and 4; the upper joint or miter line through points 4-5-6 and 7°; the lower joint or miter line through points 7°-8-9 and 10 and the throat line through points 10-11-12 and 13.

This completes the *true elevation* of the elbow with a gradual true taper from the diagonal section at the top to a square section at the bottom. Now draw dotted lines in elevation from 2 to 7°, 3 to 6, 4 to 9, 5 to 8, 7° to 12 and 8 to 9.

#### True Lengths of Solid and Dotted Lines in Elevation

All of the solid and dotted lines shown in elevation represent the bases of triangles to be constructed whose altitudes are equal to the distance or height between similar numbers shown in the true half sections. As the solid lines 6-8, 5-9 and 4-10 in elevation are on a horizontal plane as indicated in the true half sections by similar numbers, they will show their *true lengths* in elevation.

Now to obtain the true lengths of the solid and dotted lines in U in elevation refer to the diagram of true lengths for U.

Take the various distances in elevation from 7° to 12, 12 to 8, 8 to 11 and 11 to 9 and set them off on the vertical line 7°-9 at the right as shown by similar numbers. At right angles to 7°-9, from points 7°, 12°, 8° and 11° draw perpendicular lines making 7°-7, 12°-12, 8°-8 and 11°-11 equal respectively to similar numbered altitudes in the true half sections between 7 and 12, 12 and 8, 8 and 11, and 11 and 9.

For example: to find the true length of the dotted line 7°-12 in elevation, this distance was set off in the diagram of triangles for U, the perpendicular line 7°-7 was drawn equal to the altitude between point 7 in the true half sections, and the horizontal line drawn from 12 as indicated by the distance from 7 to 0.

Again as an example, take the dotted line 8-11 in elevation; the true length of the line is shown in the true length diagram U by 8-11° and was obtained by making 8-8° equal to the altitude between the horizontal lines drawn from points 8 and 11 in the true half sections and indicated by the distance s to r. In this manner all of the various true lengths will be found. Note in all the true length diagrams the true length of solid lines are shown by SOLID LINES and the true length of dotted lines are shown by DOTTED LINES.

The true lengths of the solid and dotted lines in W in elevation are shown in the true length diagram marked W in which for example the altitude 6-6° of the triangle 3°-6°-6 is obtained by taking the distance between the horizontal lines drawn from points 6 and 3 in the true half sections as indicated from s to r. At

(Continued on page 96)



AMERICAN ARTISAN

# SHEET METAL

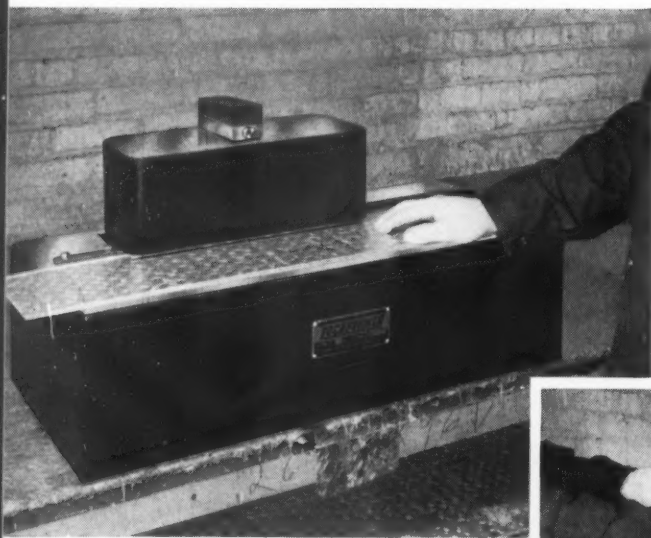
S E C T I O N



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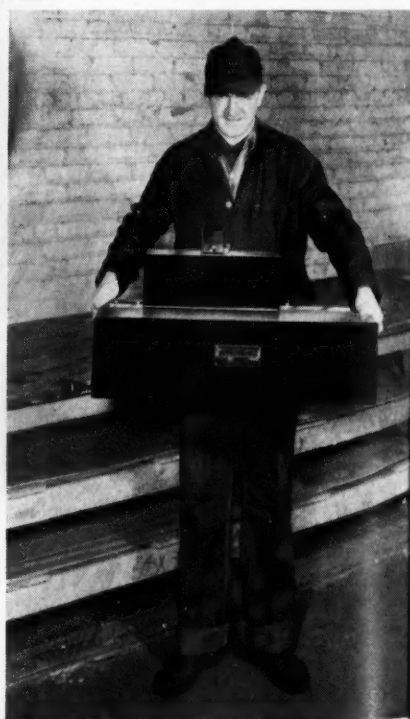
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Left—Chiseling loose the old tin roof—first step in repairs. Heavy coating to “preserve” old tin shows clearly.



Right—Old tin pulled up to show moist condition of felt paper indicating water seepage under the tin. New seamless tin with center seam in foreground.

## *Improper flashing application caused failure —* **Reconstruction Used Seamless Tin**

By Lawrence E. Gichner  
Gichner, Inc., Washington, D. C.

**E**XPERIENCE prompts one not to be too enthusiastic over a new product. Time, that most crucial of all testing laboratories, finds unanticipated flaws.

Only a few years ago a fortune was spent advertising and promoting zinc gutters, spouts, cornices and flashings. Bludgeoned by climate it

split, bulged, sagged, buckled and pulverized. Few existing examples are in evidence today. Our concern replaced thousands of pounds of zinc on residences and private institutional structures with either galvanized iron or copper.

Today we welcome on the market a new seamless roofing tin in 50-foot rolls. During the past

Below—Old tin next to new tin. Note corroded edge where old tin was flashed into wall. This is where destruction occurred.



Center — Cautiously removing last course of old tin. New tin in gutter. Right—Cleating new tin over rosin-sized paper. Cleat nails were driven into fibrous plugs.





Above — Cleaning old tin preparatory to soldering new tin to old to form seam at top of gutter.



Center—View of a long length of gutter with only one cross seam showing. This is possible with the new seamless tin used. Mechanics are soldering a "length" seam.

Below — One of the nearly flat decks covered with seamless tin. Note the single cross seam at the ridge. This seam was incorporated for expansion and contraction.



year Gichner, Inc., made dozens of installations under various conditions. To date no weaknesses or faults of either workmanship or materials are apparent.

#### Seamless Tin Advantages

The tin bends easily, is assembled quickly and represents several emphatic improvements over the old method of soldering 20 by 28 inch sheets together. By eliminating the seams, the edging and grooving tongs move swiftly and smoothly. The catching and jerky halting of the tongs bumping on the seams is eliminated. The sheets are locked much quicker. Instead of bending up four thicknesses of metal every 28 inches, we bend up four thicknesses of metal only every fifty feet, where the rolls are joined.

Both shop and factory assembled old style rolls do open at the seams. Frequently soldering on the manufactured material, is paid for by piece work and hurried skinning of the surface may result, permitting the joints to open. Even the best soldered joints come open where the sheets are bent up along fire and party walls for flashing. All too frequently nails are driven through the sheets along these areas. The nails work loose, permitting leaks which cause damage to interior wall-paper and plaster. With the seamless roll this opening at the locks is reduced to a minimum.

Our experience with tin roofing "old" and "new" style has taught us that:

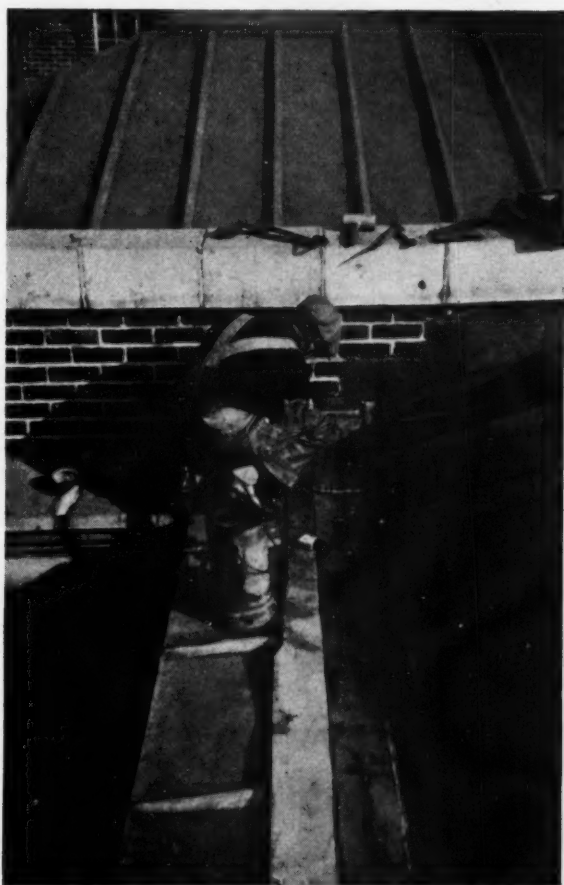
Tin under all circumstances should be placed only on surfaces that provide quick and thorough drainage. To assure this, a good roof pitch is essential. All too frequently tin is put on areas which are nearly flat. As a result the rain puddles, the water softens the paint, the paint peels off the tin, the tin rusts. "Get a paint that will not peel off," the critics of this observation advise, but discovering a paint impervious to such a test is difficult.

This new seamless material works grand in box gutters. In an installation where it fits into a reglet on its outside edge we used a blunt chisel and drove the sheet edge right into the groove. Lead plugs were spaced at intervals for security and the reglet between plugs was filled with a high grade of caulking compound.

#### Poor Flashing Causes Failure

After thirty-five years service the tin valley gutters on the Freeman's Hospital, Washington, D. C., began causing trouble. Thousands of feet were removed and replaced with 40 lb. seamless tin. The rosin building paper under the old material was found to be completely decomposed and very moist with water. Freeman's Hospital is a government owned institution under the supervision of the Department of Interior.





At top—Working the tin gutter edge into the reglet with a blunt chisel. Caulked later. Below—Installing a gable end step flashing and joining a gutter section after gutter edge is in reglet.

A considerable part of the leakage was caused by incorrectly installed flashing, where the flashing was jointed to the outside brick projection wall. Where the flashing turned into the wall at a right angle or better, the metal was solid and intact. Where less than a right angle hook had

been turned, the metal was corroded, pitted and sometimes completely gone.

Perhaps this is the explanation. Where the metal was turned at a right angle or better, the rain, coursing down the wall, was quickly shed into the drainage gutter. Where the metal was turned at less than a right angle, the rain, coursing down the wall, seeped into the joint and was conducted behind the flashing, and eventually into the interior walls and the rooms below. Moisture settled on the point and edge of the flashing in the walls and, as no paint ever reached there to protect it, it rusted the metal in due time.

In replacing the valley gutter only that much was removed which could be replaced in a day, otherwise rain would have flooded the patients in the rooms and wards below.

#### New Tin Application

The old material had been painted and frequently painted, with a heavy grade of top quality material, so that the tin was covered with a solid thickness of protection. It was where the paint didn't and couldn't get that trouble set in.

The old material was chiseled loose. As the nails which held the cleats were corroded the tin peeled off easily. The cement deck was swept clean and cracks were filled with an asphalt base cement.

The area was covered with a heavy thickness of rosin sized building paper and the new tin cleated down. The cleats were not nailed directly to the cement, but rather the nails were driven into a fibrous plug. The cement was drilled with hand chisel, the hole cleaned and a fibrous plug inserted. To this plug the cleat was made secure.

Tin does not have the same expansion and contraction as copper. How important expansion joints are in applying these new rolls it will be interesting to learn.

On this hospital job we had a number of flat decks to install. Selecting similar decks, in order to make our test comparative, we provided expansion joints on decks and eliminated them on others.

The sheets were fastened to the roof construction by cleats spaced approximately 8 inches apart. Only rosin and patented prepared fluids were used, as flux.

There are no spouts on this job. Water is conducted from the roof by cast iron pipes built in the walls. The pipes and the roofs were jointed by means of a tin collar projecting into the pipe and made tight with white lead. These outlet pipes were protected against stoppage by leaves and debris, by the use of No. 14 gauge copper-wire globe strainers. The strainers were heavily painted to avoid corrosive action where they

touched the tin.

As soon as the roof was laid all flux was removed from the tin. The entire surface was scrubbed hard with burlap and plenty of gasoline in order to remove all rosin.

On the usual residential job we used 20 lb. tin and on institutional buildings 40-lb. All the metal is given a shop paint coat on one side. This painted side we place down, though the writer has seen installations on speculative homes where the one painted side was put on the outside and this was accepted as a paint job.

#### Paint for Tin Roofing

Where it is desired to do a particularly fine paint job the following formulas can be well recommended. The different coloring is to assure thorough coverage.

Thinner may be added depending upon climatic conditions. Three coats of paint as prescribed will give any roof a tremendous advantage to battle its way against time and the elements.

#### Priming Coat:—

Paste red lead .....	100	lbs.
Linseed oil .....	17/8	gals.
Pure turpentine .....	1 1/2	pints
Liquid dryer .....	1 1/2	pints

Paint .....	4 1/2	gals.
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#### Second Coat, Light Brown—

Paste red lead .....	100	lbs.
Linseed oil .....	17/8	gals.
Lampblack .....	3/4	pint
Pure turpentine .....	1 1/2	pints
Liquid dryer .....	1 1/2	pints

Paint .....	4 1/2	gals.
-------------	-------	-------

#### Third Coat, Olive Green—

Soft paste white lead .....	100	lbs.
Linseed oil .....	3	gals.
Liquid dryer .....	1	pint

Paint .....	6 1/4	gals.
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Add color to suit.

## Scaled Model Shows Card Manufacture

LAST year a New York World Fair exhibitor came to the J. A. Temple Co., Kalamazoo, Michigan, and asked if a miniature tank might be built for their display of paper making. The Temple company said it could and submitted ideas. The exhibitor was so interested that the single tank developed into a complete, to-scale, model of all the steps in paper making from the rag stock bale to the finished cards sold by the exhibitor.

The model has now been placed on permanent display and the small, special job, resulted in several hundreds of dollars to the Temple company.

The permanent display of models is shown opposite. To follow sequence read left to right, right to left, left to right, etc. Beginning at the top row, left, the units were constructed as follows:

- 1—Belt conveyor for rag paper; pedestals and motive housing and cutter of 20-oz. punched copper with canvas belt.
- 2—Stock cooker of 4-inch copper tubing. Conveyor track from toy railroad rail. Bucket of copper, specially formed.
- 3—Washing tank of 20-oz. copper made to exact construction.
- 4—Drainer with perforated bottom holds spongy pulp made of 20-oz copper to exact specifications.

- 5—20-oz. copper truck on toy train wheels.
- 6—Beater tank to "chew" up stock, made with seamed bottom and rolled rim.
- 7—Stock truck of 20-oz. copper on toy motor car wheels.
- 8—Jordan refiner made of 20-oz. copper with copper pedestals.
- 9—Paper machine which forms the stock into continuous sheet, dries the sheet, treats the sheet so the ink will not spread, and calendars (irons) the sheet. Brass rolls of 1/8 to 3/4-inch brass bar; roll framing of copper bar, machine frames of 40-oz. copper.
- 10—Cutter which cuts three sheets simultaneously to size made of brass bars, copper frame and legs of coated welding rod.
- 11—Sheet calendar with brass bar rolls, copper frame, specially cut wheels, gears, etc., and welding rod legs.
- 12—Slitter and cutter for card making. Pedestal of 48-oz. copper, trays of 20-oz. copper. All gears, wheels, etc., specially turned by Temple.
- 13—Rolling machine and printing machine for final card manufacture made with 48-oz. sides, 20-oz. shelves, gears, wheels, mechanism specially turned by Temple.

When the models were all completed everything was cadmium plated.



RAG CONTENT BUCK PAPER IS MADE FROM FIBERS DERIVED FROM CLIPPINGS FROM TEXTILE AND GARMENT FACTORIES. ONLY CLIPPINGS MADE FROM THE FINEST STAPLE COTTON OR LINEN IS USED IN THE MANUFACTURE OF BUCK-PAPER. THE BUCK PAPER IS THEN ADJUSTED WITH THE GREATEST CARE AND CUT TO A UNIFORM SIZE FOR PROCESSING.

AFTER THE BUCK CUTTER PREPARES THEM IN AGES, THEY ARE CONVEYED TO THE ROTARY SIZES WHERE THEY ARE COATED UNDER STEAM PRESSURE TO REMOVE NATURAL WAXES AND OTHER MATERIALS INTRODUCED BY TEXTILE MANUFACTURERS.

AFTER COOKING THEY ARE CUTTED INTO WADERS WHERE THEY ARE WASHED CLEAN AND THE PEECES OF CLOTH ARE UNWASHED PRACTICALLY TO THE ORIGINAL FORM AND CONDITION OF THE COTTON.

COTTON BUCK PAPER AS THEY APPEAR IN THE WADERS.

THE STOCK IS BAG FROM THE WADERS AND LOADED INTO PAPER BAGS TO BE SHIPPED TO THE FACTORY.

THE BEATER REFINES THE FIBERS AND BRUISES THE FIBER INTO FIBER PAPER. THE BEATER IS A HEAVY DUTY MACHINE WHICH FACTURES THESE BRUISED FIBERS INTO FIBER PAPER. THE BEATER IS A HEAVY DUTY MACHINE WHICH FACTURES THESE BRUISED FIBERS INTO FIBER PAPER.

WOOD PULP FOR BLENDING WITH RAG FIBERS IN THE MAKING OF PAPER AND PAPER IS USUALLY MADE FROM SPRUCE OR REDWOOD, THINNED LOGS WITH SOME BIRCHES, AND CUT INTO SMALL CHIPS. COATED WITH CHEMICALS TO REMOVE THE NONCELLULOSE COMPONENTS, AND THEN THINLY AND BLENDING THE WHITE FIBER IS SUPPLIED TO PAPER MILLS AS BLENDED PAPER.

FOLLOWING THE BEATER, THE PAPER IS REFINED IN A REFINER. THE REFINER IS A HEAVY DUTY MACHINE WHICH FACTURES THESE BRUISED FIBERS INTO FIBER PAPER.

AFTER THE BUCKS HAVE BEEN WASHED, 30 PERCENT BUCK STOCK AS IT APPEARS IN THE BEATER.

30 PERCENT BUCK STOCK AS IT APPEARS IN THE BEATER.

PURPOSE IS TO SMOOTH THE SURFACE OF THE PAPER WHICH IS COMPARATIVELY ROUGH AT THIS POINT.

THE PAPER, AFTER LEAVING THE CALENDER STOCK, IS WOUND UP FULL WITH OR REELS. IT IS LATER SPUN AND REWOUND INTO SMALL ROLLS FOR BUCKING OR CALENDERING.

ADDITIONAL BUCKS ENRICHMENT ADDITIVE REMOVED FROM "THE BUCKS."

THE PAPER AT THIS POINT IS SUBJECTED TO A BATH OF DISOLVED GEL. THIS PROCESS IS CALLED "SURFACE BLENDING" AND ITS PURPOSE IS TO IMPROVE THE WRITING OR PRINTING QUALITY, TO IMPROVE DRINKING, AND TO GIVE THE PAPER STRENGTH, SOFT, AND A SMOOTH AND RESISTANCE TO WATER. FOR THE BEST RESULTS, IT IS ESSENTIAL THAT THE HIGHEST GRADE OF GEL BE USED AND THAT THE PAPER BE WELL SATURATED IN THIS BATH, AS IN ALL OPERATIONS, BEST PRACTICE IS GIVEN TO THIS OPERATION IN PRODUCING BUCK PAPER.

THE REFINER REFINES THE FIBERS AND BRUISES THE FIBER INTO FIBER PAPER. THE REFINER IS A HEAVY DUTY MACHINE WHICH FACTURES THESE BRUISED FIBERS INTO FIBER PAPER.

ENDLESS WOOLLEN BLANKETS, KNOWN TO PAPER MILLERS AS "FELTS," CARRY THE WET AND OF PAPER THROUGH A SERIES OF SQUEEZE ROLLS WHICH PRESS OUT SOME OF THE EXCESS MOISTURE AND PASTE THE FELTED WEB OF PAPER FIBERS INTO COMPACT AND STRONG. AFTER THIS PROCESS THE WEB OF PAPER STILL CONTAINS APPROXIMATELY 70 PERCENT WATER.

FOLLOWING TABLE AND WIRE. THE WATER REMOVAL OF PAPER REMOVED FROM FIBER CUT ON THINNESS OF FINELY REFINED WIRE SCREEN. MOVING AT THE SPEED THE PAPER IS TO BE MADE, THE WATER REMOVAL THROUGH SCREEN LEAVING PAPER FELT AND PASTED TOGETHER ON THE SCREEN SURFACE.

THE "DARBY ROLL" IS A ROLL COVERED WITH A VERY FINELY REFINED SCREEN WHICH SMOOTHS THE TOP SURFACE OF THE PAPER AND HELPS THE FELTING OF THE PAPER TOGETHER.

THE BEATER PAPER IS REFINED IN A REFINER. THE REFINER IS A HEAVY DUTY MACHINE WHICH FACTURES THESE BRUISED FIBERS INTO FIBER PAPER.

AFTER THE PAPER IS MANUFACTURED, AS IT IS BLENDED TO THE CUTTER ROOM WHERE IT IS CUT INTO SHEETS OF PREDETERMINED SIZE. THE CUTTER IS A MACHINE WITH A REVOLVING BLADE WHICH CUTS OFF THE PAPER AS IT RUNS THROUGH.

THE FINE SMOOTH SURFACE WITHOUT GLASS THAT CHARACTERIZES BUCK PAPER'S GRADE IS PRODUCED BY SHEET CALENDERING. THIS METHOD OF SURFACING IS THE SAME USED BY THE OLD CRAFTSMEN AND WHILE CALENDERING TODAY IS USED IN PRODUCING BUCK PAPER'S GRADE BECAUSE NO OTHER METHOD OF SURFACING CAN MATCH THE CHARACTER OF SURFACE SO PRODUCED.

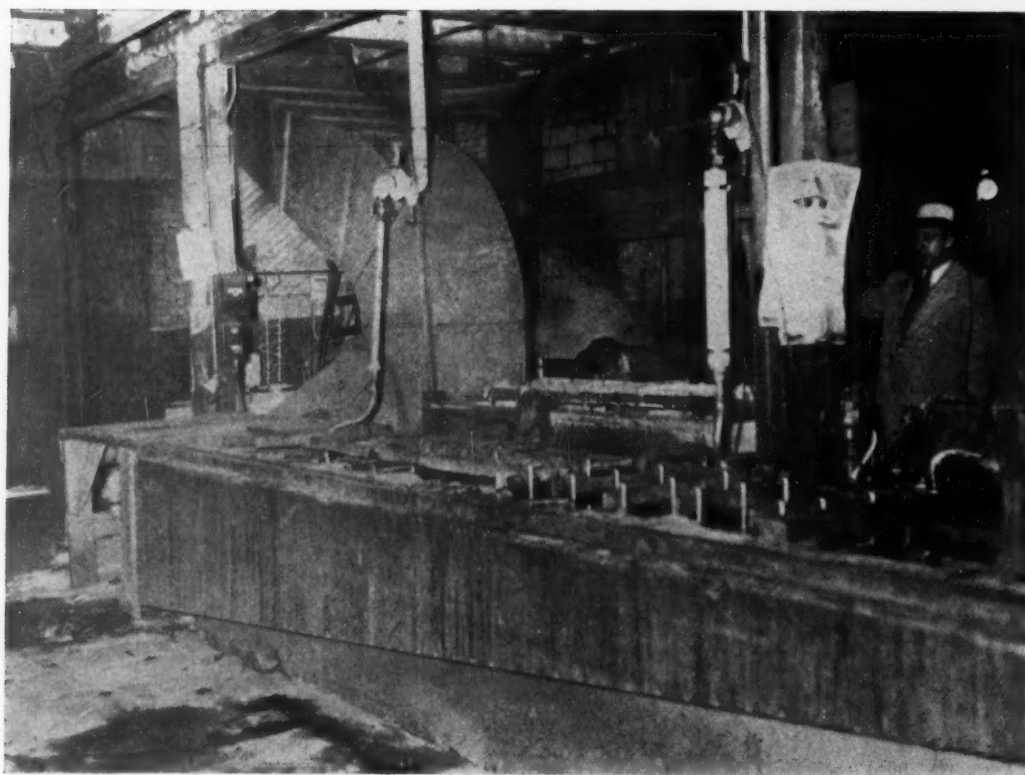
THE SHEETS ARE COUNTED OFF BY PAPER AND PACKED ON PALLETS FOR SHIPMENT TO THE BUCK-HOLDER COMPANY TO BE MADE INTO BUCKS.

"THE SHEETS ARE THEN BOUND. BUCKS RUN THROUGH THE AUTOMATIC BUCKING MACHINE. ONE AT A TIME, WHICH CUTS THE STOCK OFF LONG STRIPS AS WIDE AS THE LENGTH OF THE BUCKS ARE TO BE."

THE BUCKS ARE TAPPED ONE AT A TIME IN THE BUCKING MACHINE. THEY ARE TAPPED AUTOMATICALLY ON TO AN ENDLESS ROLL, BECOMING TIGHT BUCKS AS THEY PASS UNDER A BUCKING OF PAPER.

THE BUCKS ARE AUTOMATICALLY PACKED ON AUTOMATIC PALLETS BEING ACCURATELY SUBSTITUTION.

AND SHIPPED OUT TO CUSTOMER.



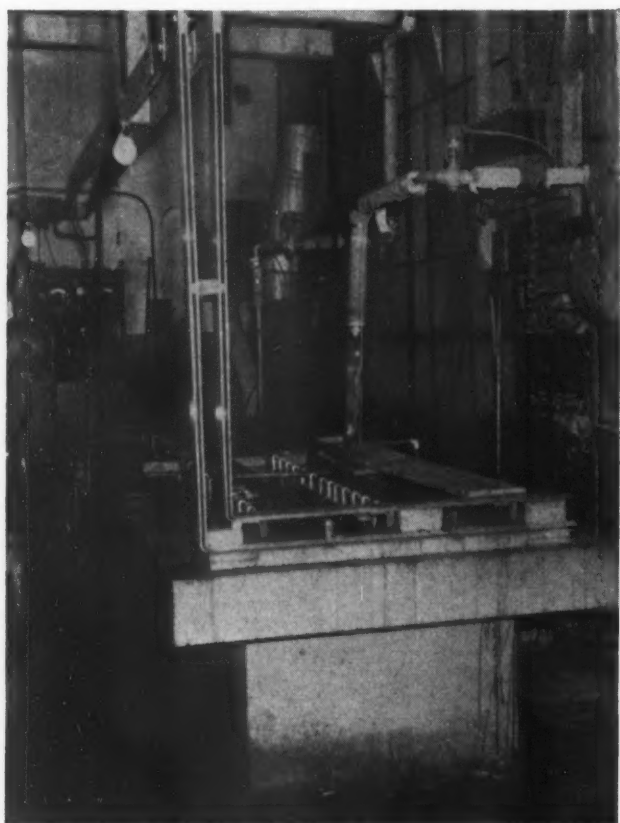
## Side Slot Fume Removal System

**A**N INTERESTING and highly satisfactory fume removal system employing slotted, side exhaust to keep the top of the tank open, is pictured in the drawings and photographs.

The installation was designed and installed by Allen-Schade Company, Detroit, in the plant of a local electro plater. The tanks are used to electrically deposit hard chromium plating on items of various size, shape, material. In the method used by the plater, the objects to be plated are suspended in the plating solution. Electric

current electrodes are suspended in the solution and are kept from metal to metal contact with the tank by the hardwood rim around the tank (see sketch).

In the plating process fumes are given off so the problem was to remove these fumes as close to the surface of the tank as possible to eliminate fume clouds and at the same time keep the tank clear of hoods to facilitate loading and unloading



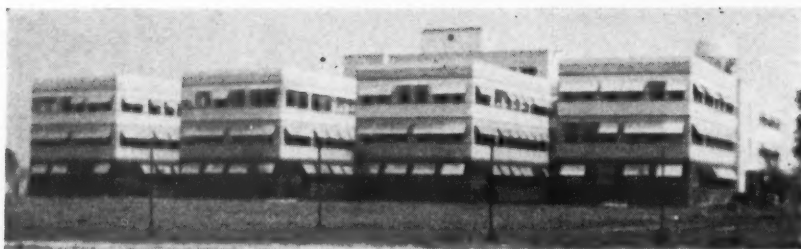
Above—Side duct of one tank system showing expansion of duct toward fan; open tank top, specified; exhaust duct from blower to outdoors. Roy E. Allen, of Allen-Schade, holds the flood light.

Left and right—Front and rear of second tank showing end and side ducts; transition from duct to blower; and unobstructed working areas provided by the system.









Left—The Animation Building (eight winged) is now completed. 150 tons of sheets went into the system. Below is a view of a conditioning plenum (see plan on page 72). Angle framing, with fill in sheets, was used.

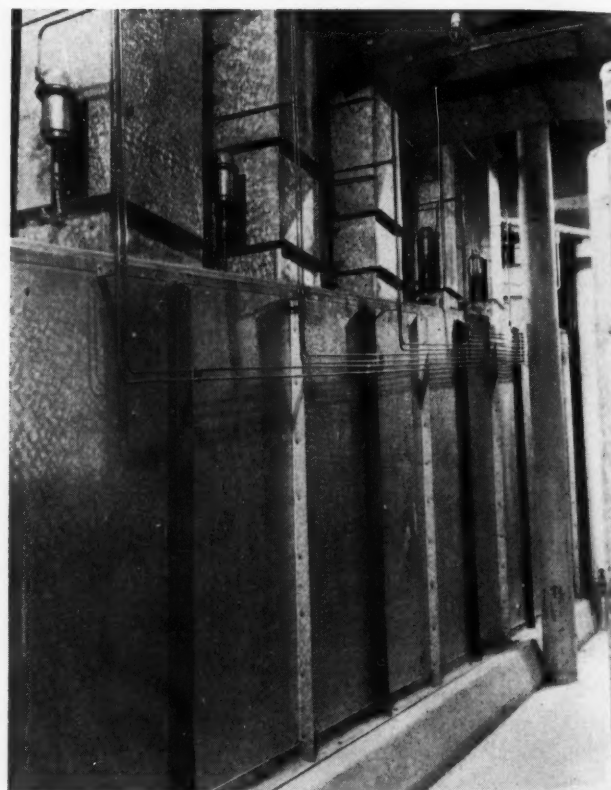
## Sheet Metal Details of the West Coast's Largest A. C. System

Data and photographs used here were furnished by General Electric Co., Walt Disney Productions and Frank E. Hawkins, a west coast contributor.

THE West Coast's largest air conditioning project is the completely air conditioned studios of Walt Disney Productions in Burbank, California. On a 51-acre tract some twenty major and minor buildings are being erected; where feasible, all buildings will be completely conditioned.

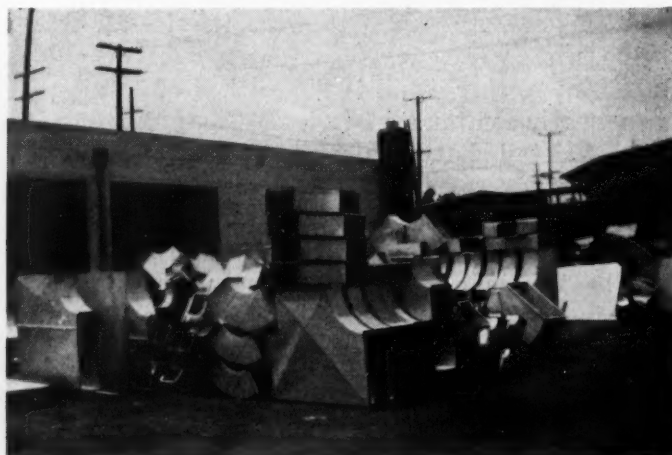
The design problems confronting the engineers were unusually severe; the installation and fabrication problems confronting the sheet metal contractors were not unusual except for the amount of material required.

As for design, Disney demanded, in characteristic fashion, the utmost provision for the health and comfort of his hundreds of employees. In the Animation Building, alone, some 900 creative



artists are employed in rooms having varying exposures, occupancies, and internal loads. In the Camera Building every particle of dust may be harmful to a finished picture. Tremendous heat loads from banked studio lights had to be disposed of without the creation of drafts.

On orchestra and dialogue stages air requirements had to be adjusted to one person or to a hundred with equal facility. Fresh air intakes had to be guarded against bringing in the zooming of airplane motors from the nearby Union Air Terminal.



During construction, piles of ducts like these were commonplace. Where possible, complete duct sections were delivered; but some ducts had to be built in four pieces. Note the variety of fittings required—and the sizes.





Above—In the sound stages air is delivered through slots between convolutions of walls and ceiling. Return is in the platform risers. Right—View of a basement plenum and risers; connections are Government Joints. Below—Walt Disney (left) and Elliott Harrington, G.E., engineer, study an air distribution and lighting fixture.



Basically of the central plant type, the system operates with hot or cold water to produce specified temperatures. A natural supply of 67-degree underground water on cold days pre-heats the entering air, and on hot days pre-cools it, thereby reducing materially the overall operating cost. Including the effect of both the natural water supply and the refrigeration equipment, the total tonnage of the job is more than 1,400 tons. A 600-horsepower multiple condensing unit plant

supplies refrigerated water for summer air conditioning all buildings on the central plant lines. In the winter most of the buildings are heated by air conditioners receiving their heat from two central 190 horsepower boilers.

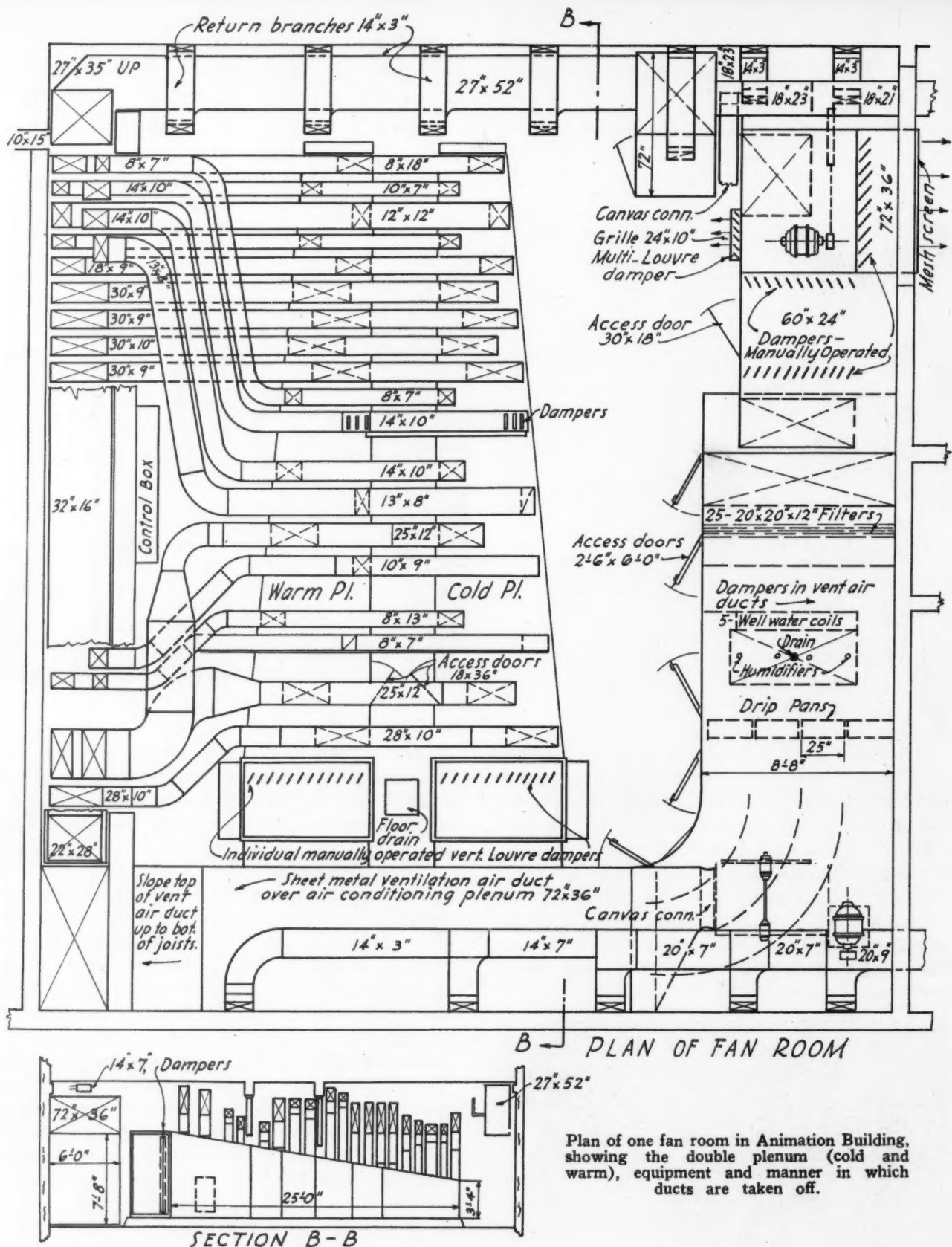
Using the heating or cooling effect of the water supplied by the central plant, individual air conditioners condition the air at a single point—or at several load centers—in each building and in most cases are located in the basement. From the conditioners the air is conveyed to the various rooms through ducts. In the winter the air is heated to the proper temperature, humidified and carefully cleaned. It is kept in constant motion and fresh air is supplied in the proper proportion (in most cases 100 per cent fresh air is used, with no room air recirculated back into the rooms). In summer the same system supplies cooled, dehumidified air.

#### Animation Building

The largest building on the grounds, arranged to accommodate some 900 creative artists who “animate” the characters in Walt Disney Productions, is the Animation Building. This structure has a total floor space of 150,000 square feet and is composed of eight wings extending four on each side from a central tier. Altogether there are more than 300 individual offices here.

Each of the eight wings is conditioned by its individual air conditioner unit. The drawings illustrate such a unit. Air is exhausted from rooms





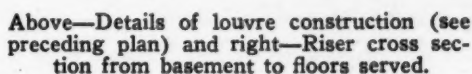
Plan of one fan room in Animation Building, showing the double plenum (cold and warm), equipment and manner in which ducts are taken off.

through continuous special baseboard grilles also embodying open-face conduits for light, telephone and signal wiring, as well as compressed air lines for the artists' air brushes. The "used" air is expelled to the out-of-doors. In the Animation Building no room air is recirculated; only fresh air is delivered through the conditioners. This air is brought to the conditioners through air shafts with intakes in the patio or on shady walls. Then it is passed through filters and next comes

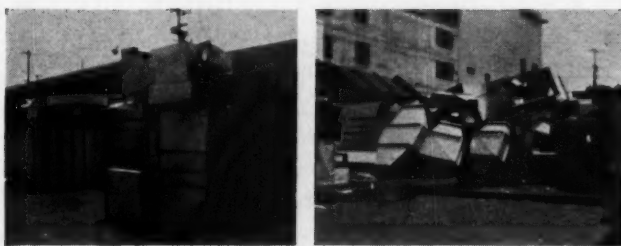
to the well water coils which, being at approximately 67 F, pre-heat in winter and pre-cool in summer. Following this step, the air is treated by vapor-jet humidifiers. Next the incoming air is divided—part is diverted through hot-water coils into a hot plenum, and part is routed through refrigerated water coils into a cold plenum.

By making available simultaneous sources of cool and warm air, and using proportioning dampers for individual take-offs, the air delivered to

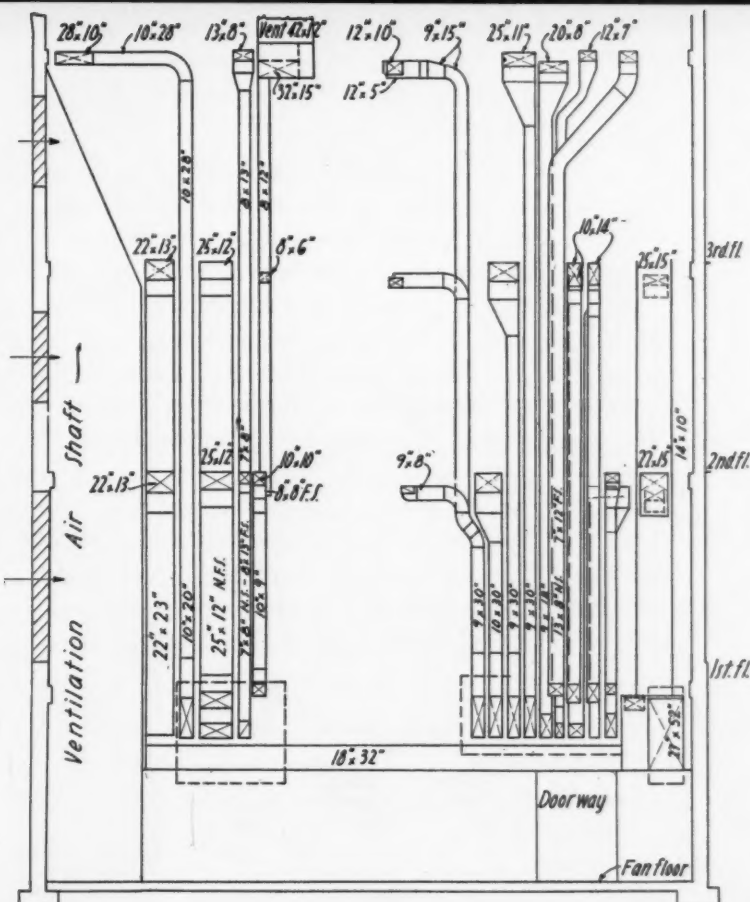
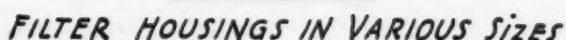




Each wing contains many rooms having different exposures, occupancies and internal loads. Projection rooms, musicians' rooms, artists' studios, and private offices are grouped on a single conditioning system. However, separate controls, ar-



Above and below—Details of filter housings. inserted in runs of duct for final air cleaning. Housings are so constructed that the complete housing may be taken out of the run by opening up the Government Joints (see sketch). Right—Louvre details for outside air intakes.



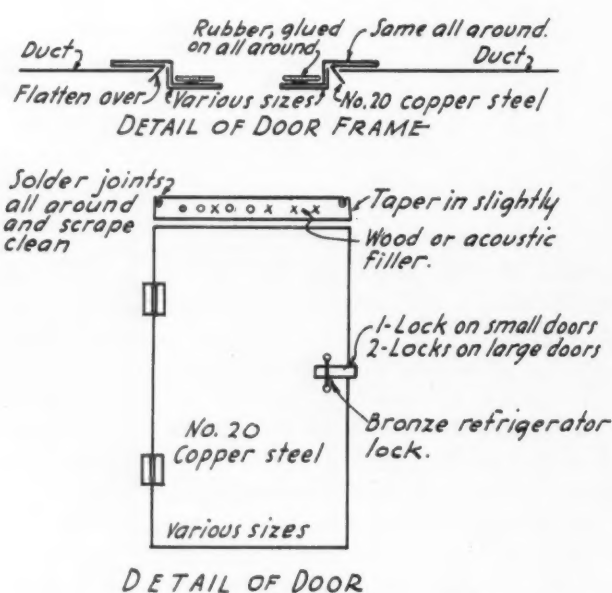
Following treatment in the central conditioners located in each of the wings, the air is ready for delivery to the individual rooms through special air-light fixtures. These fixtures, of special design to give better light to artists in the Anima-



tion Building, at the same time deliver an even film of the conditioned air across the ceiling. Thence the air moves slowly and without draft through the room to the baseboard exhaust.

Cleanliness is of particular importance in the Camera Building, for a single particle of lint or dust on a painting might, in being photographed, produce light effects that would be harmful to the finished picture. The operators even wear special "lintless" clothing.

In the camera rooms, the problem of heat removal without drafts was encountered, since some of the single cameras use more than 70 KW of lighting energy (70 KW of lighting energy produces about 240,000 Btu of heat per hour). Where



Access doors are sprinkled plentifully through the system. Construction is uniform and according to the detail above. Doors are insulated against noise and temperature drop.

possible, exhaust hoods are used to draw off air at the points of heat concentration, and multi-outlet air distribution permits the delivery of the required cooling effect without drafts.

#### The Big Stages

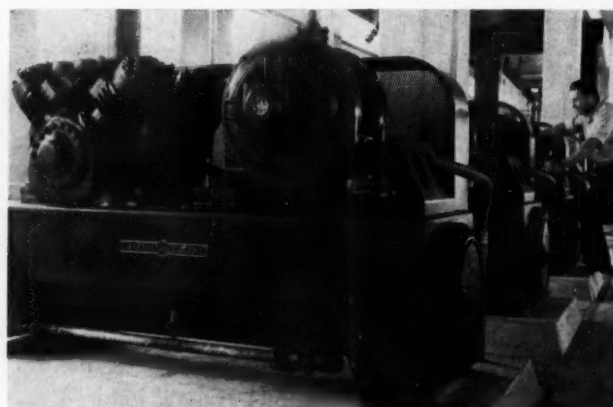
The Orchestra Stage is built with a special acoustic shell backing up the orchestra to provide maximum brilliance of sound without echo or distortion. Since at some times large groups of musicians may be on this stage for recordings, while at other times there may be only a single performer, controllable as well as even air distribution is needed. To permit this, the entire space above the top of the acoustic shell is built airtight, and the air conditioning system fills the airtight space with air under slight pressure. Released to the stage through a series of slots behind the convolutions in the shell, the air is exhausted

evenly through grilles located in each platform riser, below.

#### Fabricating Details

The drawings, details and photographs cover only the Animation Building and, further, only one system in one wing of that eight-winged building. Since most systems in this and other buildings are similar, the metal fabrication and installation problems are nearly identical. In the Animation Building some 150 tons of copper bearing steel sheets were required.

The equipment is located in the wing basement, in a housing (section B-B) of 16- and 18-gauge galvanized iron as shown in one photograph. Risers and ducts to the rooms above come off the top as shown in the elevation. In the housing are the blower, dampers, heating and cooling coils, filters and humidifiers. The housing extends as a plenum



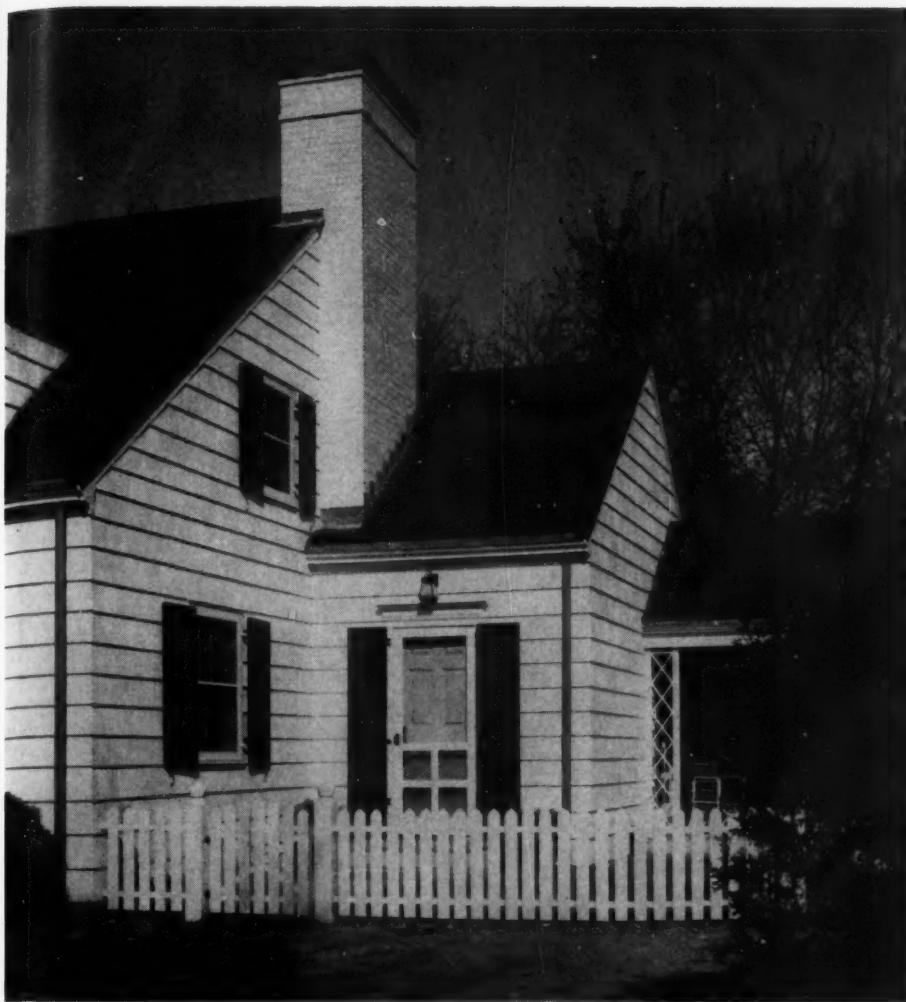
Row of compressors of one system for the Disney Studios.

as shown in the fan room plan. The plan also shows the twin ducts to each space served whereby the air is mixed and proportioned from the heating and cooling plenums.

Duct construction, also risers, follow standard construction. All pipe and fittings were fabricated and assembled as complete sections, except very large ducts, in the sheet metal contractors' shop. Government joints were specified where possible; where space prevented these, "S" clips and drive clips were used. Gauges ran from 26 gauge in 14-inch to 20 gauge in ducts over 40 inches wide. All butterfly and friction dampers used throughout the systems are 20 gauge steel.

There are a number of interesting specials in the system. Access doors are constructed as shown in a detail, filled with acoustical material and set in special frames with rubber seals. Throughout the systems additional filtering is obtained by filters set in the ducts in special housings made as shown in a detail. These housings can be taken out of the duct as needed. Louvres and back draft dampers were incorporated liberally and constructed as shown in two sketches.





Right and below—Lead caps on double and multi-flue chimneys showing possibilities of making the cap an architectural feature as well as a protective measure. Note that the cap is self-drip with a wide skirt. (Photographs from Lead Industries Assn.)

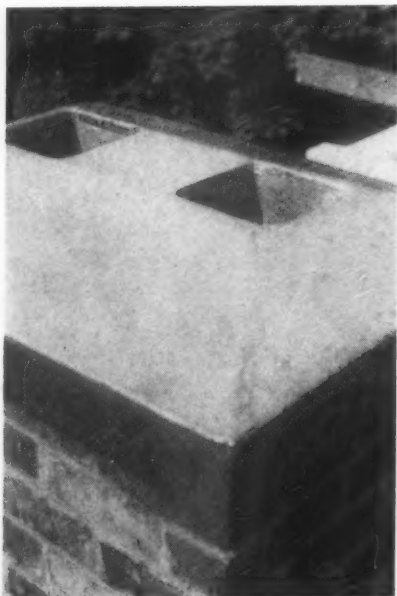
## LEAD CHIMNEY CAPS

**S**HEET metal contractors, looking for new services to offer may find a profitable idea in the installation of lead chimney caps. While these caps have been specified for a number of years by a few architects—long enough to prove their complete practicability—they have not been widely employed because few contractors went out and sold them.

The purpose of the lead chimney cap is to protect and waterproof the brick or masonry tops of chimneys. Moisture may permeate these porous materials and joints where, upon freezing, it will crack the chimney tops and crumble the mortar from the joints. This will not only destroy the chimney structure with danger of falling parts, but will provide access for moisture into the house to deteriorate the structural members. Moreover, without adequate protection the joint between the flue lining and the chimney will almost never be watertight.

To install chimney caps 4-lb. soft lead or 3-lb. hard lead should be used. The cap should be made in one piece covering the entire chimney top and extending down the sides, turning under the overhang where it is held in place by lead cleats built into the masonry. The corners should be dog-





Left—A remodeling cap and right, the badly broken chimney before capping. Either installed new, or installed as a repair project, the cap prevents the destruction shown at the right.



eared on the inside and dressed snugly against the chimney. For the flues a square or round cut should be made in the cap, allowing sufficient excess material to turn down inside the flue lining, flashing this joint. Where round flues extend above the chimney top, sleeves should be soldered to the lead cap on the outside of the flue and likewise turned down, snugly dressed, inside the lining.

It is important that lead be used, for it is the only material not affected by the usually corrosive action of flue gases and that is flexible and pliable, allowing easy working and fitting, and economical.

## Way—Houston's Attic Fan Pioneer

(Continued from page 46)

The Consumers Buyers Campaign works somewhat on this basis: the C. B. C. acts as a clearing house for sales leads for the cooperating merchants and dealers. For instance, if citizen John H. Jones learns of a prospect for one of Way's attic fans, Jones notifies the Consumers Buyers headquarters which, in turn, notifies Way. If Way sells the fan, Jones receives some sort of credit or commission. However, Way feels they have received very little practical benefit from this source.

### Way Was Houston's Pioneer

Reminiscing of their early years with attic ventilation, Mr. Way said they had been selling attic fans for some years before the vogue of attic ventilation really began. They ran across some Cool-air literature on attic ventilation in 1934, and proceeded to order a trial fan.

Since there were no installation manuals to go by, and no one to turn to for technical assistance, much difficulty was experienced in setting up this first fan in the Way home. However, a factory man soon came through and demonstrated the proper technique. Once the fan was properly installed, it gave such thorough evidence of its ability and usefulness that neighbors and friends who visited the Way home to see the new device, became purchasers of it.

Then the Houston Lighting and Power Company, under the leadership of H. E. Dorrill, sales promotion supervisor, became interested in attic fans, and commenced a vigorous campaign for their popularization and sale. The electric utility technicians, in company with a Way representative, would cruise about the city, spotting locations which seemed to be architecturally suitable

for attic fan installation, without the necessity of very much building alteration. These were contacted, and a number of sales resulted.

### Poor Installations Are Handicaps

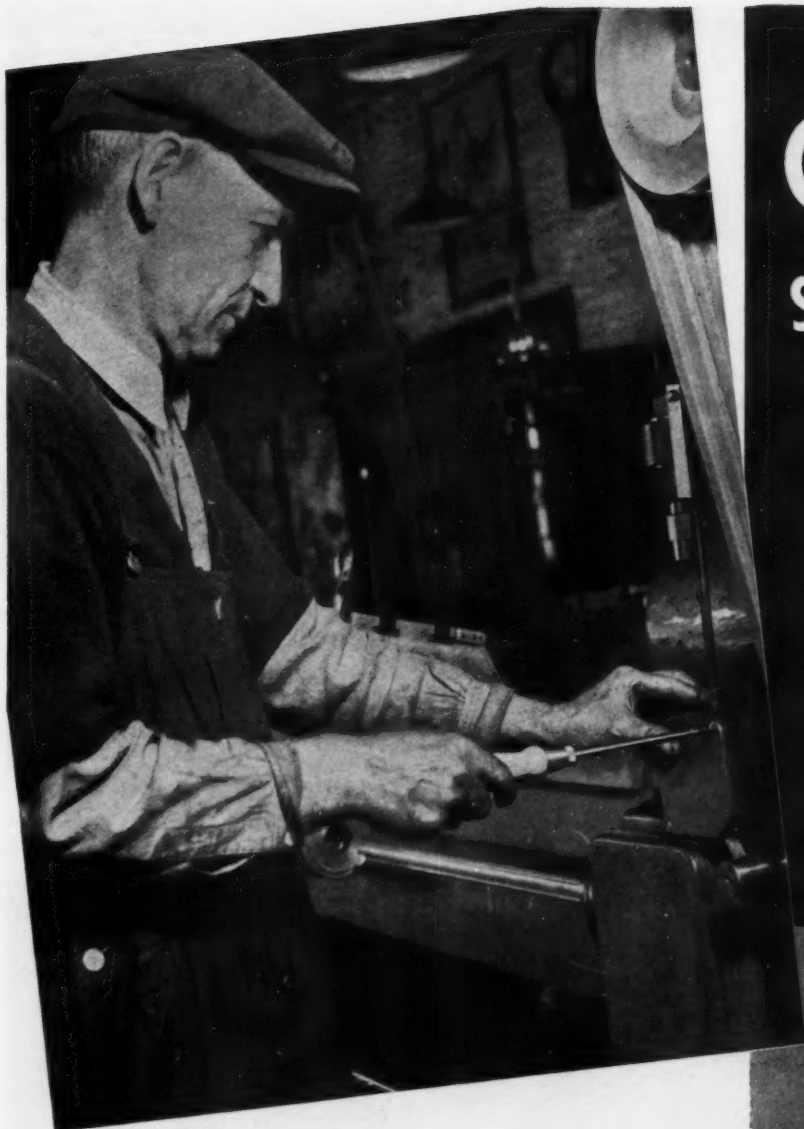
Much of the sales resistance met today is due to the fact that the prospect has had the misfortune to encounter somewhere a home where a badly-designed fan has been improperly installed, Mr. Way says. The fan may be noisy, inefficient; it cannot possibly perform the functions it is supposed to cover. But that poor installation serves to fix in the prospect's mind, a determination that he'd rather suffer the heat than put up with such disagreeable noise and vibration.

On the other hand, where a prospect has actually seen one of the efficient, modern fans, properly installed, in operation, and has experienced the refreshing effects of house-cooling by air movement, the attic fan salesman has an excellent chance of closing another sale.

With a line of fans ranging in price from \$57.50 to \$1,400.00, naturally a large number of interesting installations have been made, and both large and small homes have been equipped. Reviewing all installations over the past several years, the average job has cost about \$250, Mr. Way says. The furthest away they have gone to install fans was at Abilene, Texas, approximately 600 miles from Houston, where a fan was installed for the State of Texas.

Carefully considering all past promotional methods used, Way Engineering Company believes that prospects referred to them by satisfied customers is the foundation upon which their ever-growing attic ventilation business rests.





# CRESCENT SCREWDRIVERS

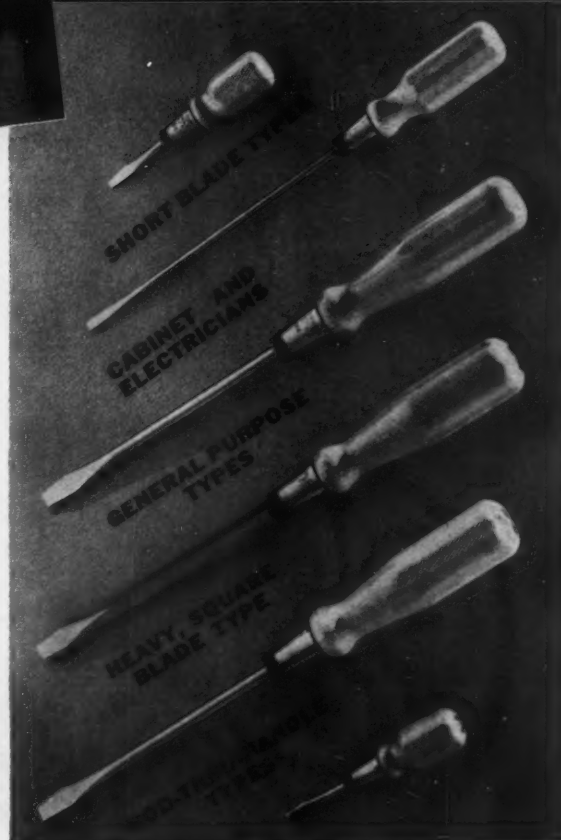
**REALLY  
COST  
LESS!**

● When you consider the better performance and longer service life which you not only can expect but actually get from Crescent Screwdrivers—they are one of the most economical small tools which you can buy. Many of the country's largest industrial plants have proven this to their complete satisfaction. These buyers have experience and records to back their selection.

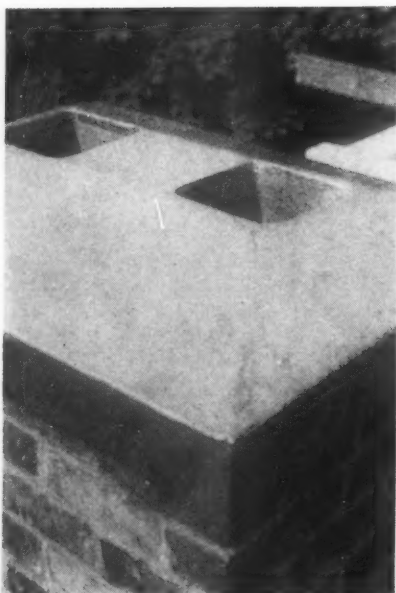
There is a Crescent type for every class of work. Blades are drop-forged from alloy steel; Shanks spring-tempered to withstand abuse; Points are clean-cut, sharp and properly hardened for long service. Ferrules, turned from a solid bar of steel, are forced on to the blades under heavy pressure. Handles of seasoned, straight-grained, hard maple are driven firmly into the ferrules. Flutings on blades grip both ferrule and handle.

Standardize on Crescents for real screwdriver economy. Sold by hardware dealers everywhere. New catalog on request.

**CRESCENT TOOL COMPANY, Jamestown, N. Y.**



# CRESCENT and Smith & Hemenway TOOLS



Left—A remodeling cap and right, the badly broken chimney before capping. Either installed new, or installed as a repair project, the cap prevents the destruction shown at the right.



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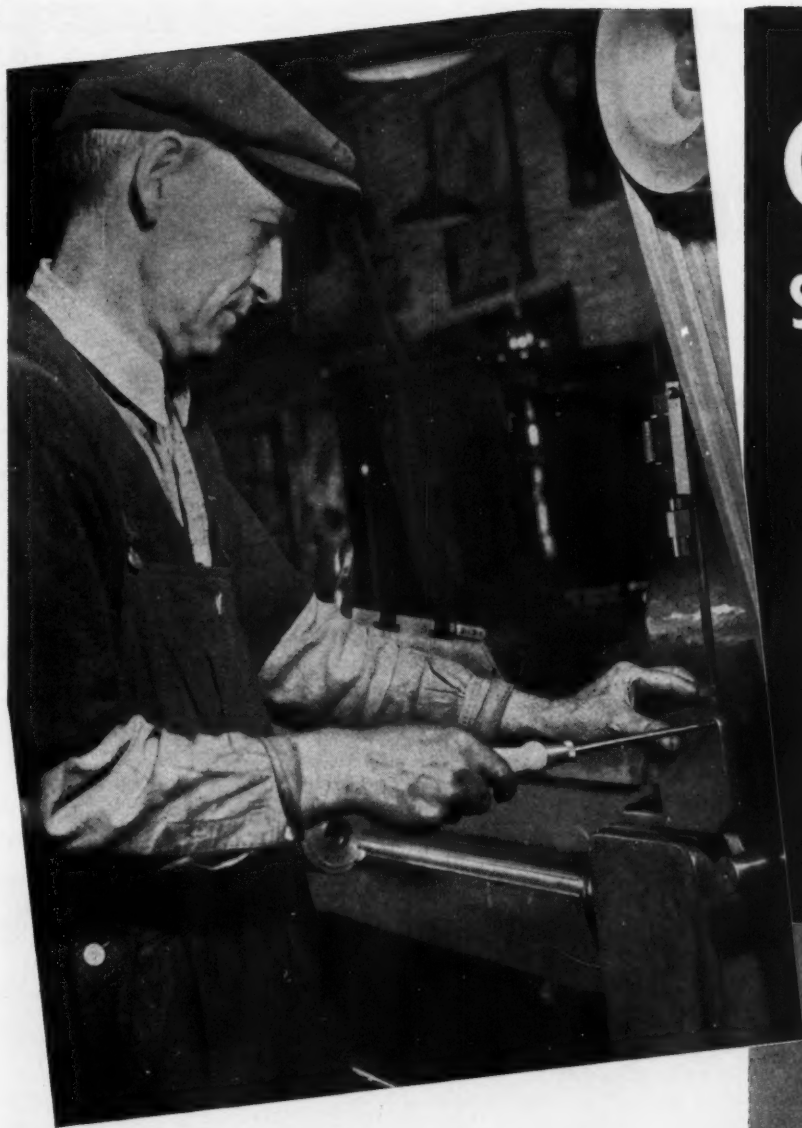
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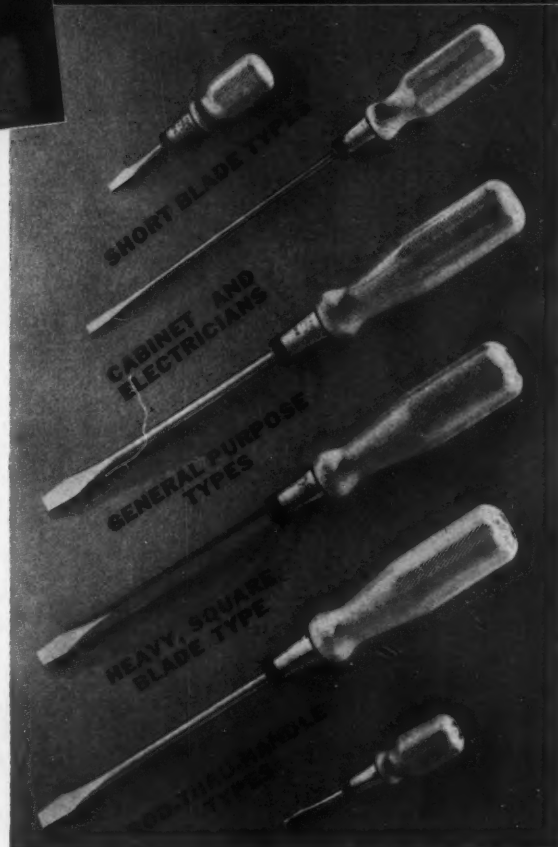
**REALLY  
COST  
LESS!**

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# CRESCENT and Smith & Hemenway TOOLS



**ARRIVING TIME;  
1 HOUR:  
35 MINUTES!**

1. "AT 11:50 A.M. recently we received an order for 10 plates and one angle to be cut. Customer specified material must be in Jersey City at 1:30 P.M. the same day."



2. "THE MATERIAL was trucked from our Newark Warehouse to Jersey City—10 miles distant—arriving at 1:25; one hour and 35 minutes after the order was placed."



**T**HOUSANDS of customers have discovered that when an emergency arises Scully is always ready to meet it with service to match the occasion. And our customers have also found out that regular orders receive the same prompt, courteous attention. Each of our 8 warehouses operates on the principle that our

customers always want immediate delivery—we hurry whether you ask us or not.

The next time you order steel or steel products, why not call Scully and discover why "Scully Service" is famous the country over? And ask for a free copy of our handy 1940 Stock List and Reference Book.



**SCULLY STEEL PRODUCTS COMPANY**

*Distributors of Steel, Steel Products, Copper and Brass*

Warehouses at CHICAGO • NEWARK, N. J. • ST. LOUIS • BOSTON  
ST. PAUL-MINNEAPOLIS • CLEVELAND • PITTSBURGH • BALTIMORE





# 1940's Building Prospect\*

By Thomas S. Holden  
Vice-President, F. W. Dodge Corp.

THE total of construction contracts awarded in the 37 Eastern States during the year 1939, as recorded by F. W. Dodge Corporation, was \$3,550,000,000. This was nearly three times the figure for the year 1933, which was the lowest depression year; annual gains were continuous during the past six years. Residential building has been gaining continuously for the past five years; the 1939 contract total was \$1,334,000,000 compared with \$249,000,000 in each of the years 1933 and 1934. These continuous gains have not in any way resulted from a speculative building boom.

It is well remembered by everyone here present that the factor that first started construction on the upgrade was the big Federal public works program. The combined contract volume of the past six years was about evenly divided between publicly financed and privately financed construction. But public work has been tapering off and, as we all know, the question of continued recovery gains depends upon whether private construction can continue to increase in sufficient volume to offset declines in public construction activity.

## 1940 Should Be a "Good" Year

The 1939 record encourages us to believe that private construction should continue to increase at a satisfactory rate. Last year's gain in contract volume over 1938 for the 37 Eastern States amounted to \$353,000,000, or about 11 per cent. The dollar increase in contracts for private construction was \$350,000,000, compared with a gain of only \$3,000,000 in publicly financed construction. Private non-residential building increased over 1938 by \$49,000,000; private residential building increased by \$144,000,000; and privately financed engineering construction increased by \$57,000,000. The net gain of \$3,000,000 in publicly financed construction resulted from:

- 1—A decrease of \$156,000,000 in publicly financed non-residential building.
- 2—An increase of \$104,000,000 in publicly financed residential building, mostly subsidized public housing.

\*Address (deleted) at the annual convention of the New York Sheet Metal, Roofing and Air Conditioning Contractor's Assn., Utica, March 27, 1940.



- 3—An increase of \$55,000,000 in publicly financed engineering work.

Last year's increased construction activity was accompanied by a marked improvement in general business activity. Compared with the full year 1938, industrial production increased 22 per cent; factory employment, 7 per cent; factory payrolls, 17 per cent; freight car loadings, 14 to 15 per cent; retail trade, 3 per cent to 15 per cent, according to locality. This general business improvement, though affected to some extent by war psychology, was definitely not a war boom. It started about June of last year, a full three months before the war declaration, and continued through to the end of the year.

## 1939 Pace Could Not Be Maintained

However, the rise in general business activity that took place between June 1 and December 31 last year was at a pace that was too rapid to continue. The Federal Reserve Board's index of industrial production rose from 92 in April and May to 125 in December. It was obvious that the rate of activity that prevailed in the fourth quarter of 1939 could not continue into the first quarter of this year. From 125 in December, the index dropped to 119 in January and 109 in February. If this decline had not been widely anticipated in advance, it might have been considerably more disturbing to business confidence than it has actually been. First quarter business trends to date have been quite mixed. Fortunately, it seems probable that the decline will be arrested shortly, and the second quarter is likely to see a reversal of this trend, with an upward resumption of industrial activity. The index is still considerably above the point where it stood at this

time last year, and it is expected to average in 1940 some points higher than the 1939 average.

Realization of this anticipated upturn in industrial activity is of the utmost importance to private building and engineering activity. The rate of industrial production and general business activity affects quite directly the demand for commercial and industrial building, and increased employment and purchasing power are very definitely needed at this time to sustain the demand for private residential building.

#### First Quarter Started Slowly

The uncertain trend of general business was duplicated by an uncertain construction trend during January and February. At the end of the first two months, the record for the 37 Eastern States stood as follows: Private construction contracts, 4½ per cent ahead of last year; public construction contracts, 33 per cent behind last year; total construction, 33 per cent behind last year. Residential building contracts, including both public and private work, ran 4 per cent behind the first two months of 1939. Undoubtedly, the protracted cold weather was an important factor in reducing the contract volume that much.

Fortunately, the records for the first half of March have already changed the picture quite considerably. Residential building contracts ran substantially ahead of the corresponding fifteen days of March, 1939, in 14 out of 15 Dodge districts and in the 37 Eastern States, as a whole. Total construction was ahead of last March in 9 out of the 15 districts, and in the 37 states as a whole. Residential building, which ran a little behind 1939 in January and in February, has already caught up with last year and should show a moderate gain for the quarter as a whole. It is also of interest to note that the Federal Housing Administration is reporting that during the past three weeks the number of applications for new mortgage insurance have set successive new high records. Consequently, the outlook is very promising indeed for a much better contract record in the second quarter than we have had in the first.

#### 1940 Overall Increase

As of March 15, private construction contracts were nearly 9 per cent ahead of the corresponding period of 1939. In view of the year's slow start and the recent signs of improvement, the F. W. Dodge Corporation's estimate of an 11 per cent increase in private construction for the year as a whole seems very likely to be attained or possibly bettered somewhat. This estimated 11 per cent increase in private construction was accompanied by an estimated 10 per cent decline in public construction. As of March 15, public building and engineering contracts were 31 per cent behind the corresponding period of last year.

#### Construction Forecast

Our estimated 11 per cent increase in private construction and 10 per cent decrease in public construction would, if realized, give a 1 per cent increase in total construction volume. A summary of the F. W. Dodge Corporation's 1940 estimates by classes can be given here, the figures being based on dollar volumes of contracts in the 37 Eastern States:

*Commercial Buildings:* An increase of 17 per cent over 1939.

*Manufacturing Building:* An increase of 37 per cent.

*All Other Non-Residential Buildings* (principally public and institutional buildings): A decline of 16 per cent; hospitals and religious buildings are expected to increase somewhat, and the other classes to decline.

*Residential Building:* A 4 per cent increase in private residential building and a 78 per cent increase in public residential building, netting a 15 per cent increase in all residential building. Large-type residential buildings (apartments and hotels, including both privately and publicly financed) are estimated to increase about 36 per cent; one- and two-family houses are estimated to increase about 6 per cent. New family dwelling units would increase in about the proportion of total dollar residential volume, 15 per cent.

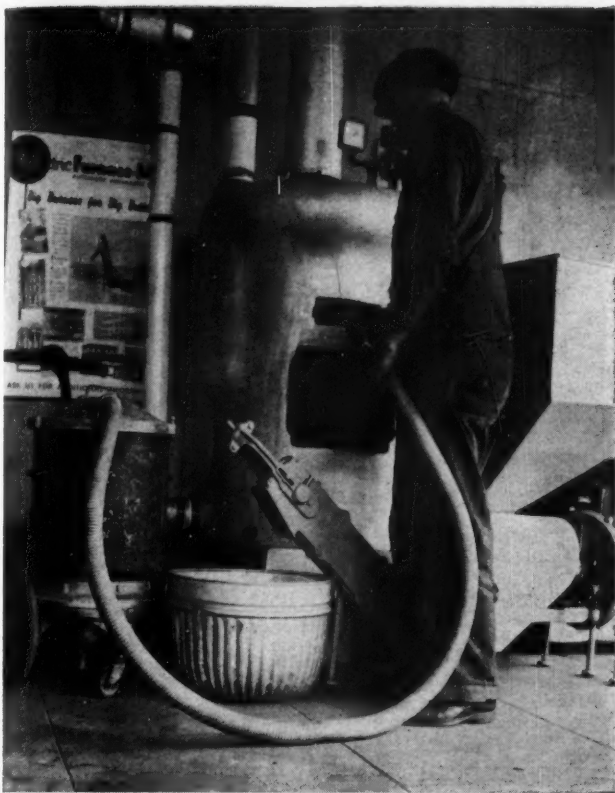
*Heavy Engineering Construction* (public works and utilities): the total volume is estimated at 15 per cent under 1939, the net result of approximately the same amount of highway construction, sizeably increased electric utility construction, and declines in all other classes.

#### European War Effects

While the impact of the European war upon our whole economy has been felt already and will continue to be felt in numerous ways, it has become increasingly evident since September 1 that the course of events in this country will vary in many important particulars from the pattern of 1914-1918. This war itself is very different from the other one, and the attitude of the American people is radically changed this time. In 1812 and again in 1917, we were drawn into general European wars to defend the freedom of the seas. The Congress of the United States, with the approval of a majority of the American people, has voluntarily abandoned the freedom of the seas as not worth fighting for. American business leaders have practically unanimously and, I believe, with sincerity, disclaimed any desire for a war boom and have used every proper means at their disposal to curb inflationary prices and inflationary buying. In 1917, there was no widespread fear that the totalitarian mobilization of

(Continued on page 90)





# Automatic Coal Burner Corp. Services 700 Plants Yearly

By R. C. Nason

whom continue actively to use their stokers. Recent installations require little or no attention, stated Mr. Decker, but, like old autos and other machines, after mechanical appliances have been in service for a number of years, parts wear out, improvements may be added, controls may have to be replaced. Granting these things, it appears to this contractor best to get them attended to in early summer before their new installation period starts. This usually is during July.

## Two Service Plans Offered

The Automatic Coal Burner Corp. has two distinct service agreements. One is an annual contract, the other a late-spring special. In the yearly agreement, members of the service department, headed by A. Weyer, and staffed by three regular mechanics, make monthly inspections. At these times moving parts are oiled and greased, heaters and appliances wiped clean of dust. Adjustments are made, if required. This contract also covers two vacuum cleanings, one in winter, another in summer. In this type of agreement, experience teaches that appliances and plants operate faultlessly all the time, as a rule without need for special summer repair attention. The an-

**M**AINTENANCE of heating business sales volume throughout early summer, when the normal tendency is to slump, can be effected via the avenue of a special drive on service during May, June and July, found Automatic Coal Burner Corp., Union City, N. J., a leading stoker and heating contractor.

Like most everything mechanical, stokers and oil burners require at least some measure of service during the year. Dealers have their choice as to whether to provide "free" attention or whether to put the service on a paying basis. The Automatic Coal Burner people find the paying service to be more satisfactory, advises E. J. Decker, manager.

Having operated a thriving stoker leadership in the New Jersey area surrounding Union City for the past 15 years, naturally, a large number of units have been sold. The card files of the Automatic firm show 3,000 names, practically all of



Automatic Coal Burner Corp., has a "showy" showroom. The firm sells a variety of equipment, but stoker sales and air conditioning are the chief activities.

nual service contract list includes 300 customers. The charge is \$25.00 minimum, but is increased for commercial installations.

As this is but one-tenth of the total user list, the dealer makes a special appeal in late spring. Form letters covering the offer are mailed in May. Summer contracts are signed until July 15, although work may be done anytime before October 15. But if customers do not sign before July 15 they have to pay slightly more if they wish summer overhauling and cleanup. The drive usually adds 500 to 600 more names to the required-service work schedule.

To handle the special summer service work, an additional crew of 3 is employed, to make a full force of six. The men usually work in pairs, hav-

Form letters to customers and prospects (right) are mailed each May. Some 3,000 letters are mailed first class and the usual return is 900 prospects and 500 to 700 "sales." The cleaning and service contract (below) permit the customer to specify his needs and, when signed constitutes an order. Note blank lines for user prospect suggestions.

## Automatic Coal Burner Corporation

HEATING EQUIPMENT



4836-38 HUDSON BOULEVARD, WEST NEW YORK, N. J.  
Telephone: PAIside 6-0400 - 0401

Dear Sir:

We are enclosing herewith order blank in connection with cleaning of your ELECTRIC FURNACE-MAN and boiler. It has been our experience that the greatest amount of depreciation in heating plants is during the summer months especially due to rust and corrosion caused by damp coal and ashes remaining in the heating apparatus.

You, no doubt, are familiar with the necessity of cleaning your furnace annually after the fire is discontinued. The ELECTRIC FURNACE-MAN should also be cleaned - with particular attention to the following:

REMOVING all coal from the hopper, worm and fire pot;  
REMOVING all ashes from the ash worm and ash elevator;

GREASING and oiling all bearings as well as those parts subject to rust.

We shall be pleased to give you any further information on this subject that you may require, or, if you will fill out the enclosed blank, stating thereon any additional work that you may want, our service department will do this work for you and relieve you of any worry in connection with it.

The charge for this service is nominal, depending upon the time necessary.

Yours very truly,

AUTOMATIC COAL BURNER CORP.

E. J. Decker,  
Treasurer.

EJD:MZ

N.B. Unusual and difficult heating problems will receive our immediate attention - tell us about them.

## Automatic Coal Burner Company

HEATING EQUIPMENT



4836-38 HUDSON BOULEVARD, WEST NEW YORK, N. J.  
Telephone: PAIside 6-0400 - 0401

Date.....19.....

You are hereby authorized to perform the following work in connection with my heating plant:

REMARKS:

1. Clean "Electric Furnace Man"
2. Oil and Grease same
3. Replace parts where necessary
4. Clean and scrape boiler or furnace
5. Clean flue pipe connecting boiler and chimney
6. Repair any defective insulation (asbestos)
7. Paint boiler doors and trim
8. Clean Thermostat points and oil motor

LIST OTHER ITEMS:

- 9.
- 10.
- 11.
- 12.

I would prefer having the above work done on or about.....19.....

Signed.....

Address.....

Telephone No.....

NOTE: CROSS OFF ITEMS NOT WANTED. List other Nos. 9, 10, 11, 12. Special accessories (see list). Send Estimates for Thermostat, etc.

We are thankful to you as a user of the "Electric Furnace Man" for the continued increase in our business. Should you have acquaintances who have expressed their desire for an Electric Furnace Man, kindly list their names below.

Name

Address

_____	_____
_____	_____
_____	_____

Shall we mention your name YES - NO

Thank You

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An important feature of the overhaul-clean-up job is the examination and adjustment of automatic controls, their calibration, wiping dust off active parts, examination of wiring connections and sundry other minor work. The procedure enables the full crew to complete an average of three thorough jobs daily, thus collectively finishing about 700 jobs between shut-down and startup of heating plants, that is, from May 15th to Sept. 15, with some earlier and some later contracts being fulfilled.

The benefits of the special summer drive along the indicated lines are, at least in part, accumulative. By which is meant that the plan prevents





Automatic operates three service trucks like the one above. Everything for cleaning and service is stocked in the truck. The show room is orderly, clean and displays equipment as nearly like actual installation as possible.

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#### "Orphan" Devices Service

Still another feature of summer service is in connection with "orphan" stokers and oil burners. This refers to appliances sold by manufacturers and dealers who have gone out of business. Not infrequently the Automatic Coal Burner Corp. has to have machine shops and foundries make special parts. Most repair work is done on location, although now and then appliances have to be removed and taken to the shop of the Automatic company. Included in this contractor's summer service plan also, are oil burners and oil-fired plants.

The company makes no distinction in make or style of equipment serviced except when stokers are of large capacity, say, 85 lb. per hour or larger. Otherwise the special service offer includes the dealer's own installations, "orphans" and oil-fired plants, in general. The price is the same, take them as they come, \$10.00 minimum. The usual annual form letter mailing calls for 3,000 letters under first-class postage. About 900 replies result in contracts varying from 500 to 700 in number.

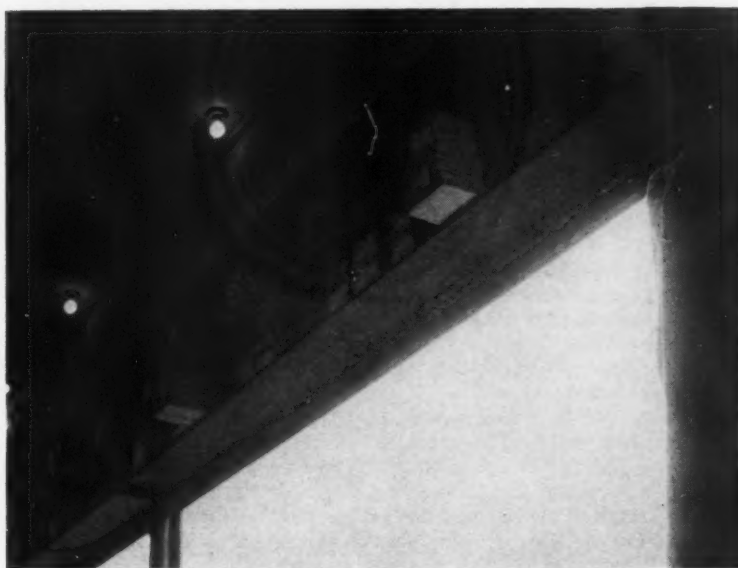
The foregoing described campaign maintains activity during months when order-taking for new installations of the stoker handled for the last 15 years by this dealer tends to slow up. But stoker selling gains momentum usually before July 1 so that as service activity tends to dwindle

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To fully handle its service requirements the Automatic company maintains some \$350 worth of thermostatic controls on hand as well as carrying in stock at least one new, spare motor for every size, model and type of stoker appearing on the user list. Altogether, this dealer carries over \$5,000 inventory, including stokers. Special service soliciting letters, if not answered by those who previously have ordered special summer overhauling, are followed up by telephone because, Mr. Decker says, he must know why continued summer service is not desired. In case of fault finding, steps are taken to ameliorate those dissatisfied.

Occasionally special service requirements occur in which even more complete service than regu-

*(Continued on page 104)*



A large inventory of automatic control equipment is kept in stock. Controls are serviced regularly since Automatic finds customers like their control systems to function smoothly and control replacement is a profitable business.

nual service contract list includes 300 customers. The charge is \$25.00 minimum, but is increased for commercial installations.

As this is but one-tenth of the total user list, the dealer makes a special appeal in late spring. Form letters covering the offer are mailed in May. Summer contracts are signed until July 15, although work may be done anytime before October 15. But if customers do not sign before July 15 they have to pay slightly more if they wish summer overhauling and cleanup. The drive usually adds 500 to 600 more names to the required-service work schedule.

To handle the special summer service work, an additional crew of 3 is employed, to make a full force of six. The men usually work in pairs, hav-

Form letters to customers and prospects (right) are mailed each May. Some 3,000 letters are mailed first class and the usual return is 900 prospects and 500 to 700 "sales." The cleaning and service contract (below) permit the customer to specify his needs and, when signed constitutes an order. Note blank lines for user prospect suggestions.

## Automatic Coal Burner Corporation

HEATING EQUIPMENT



4836-38 HUDSON BOULEVARD, WEST NEW YORK, N. J.  
Telephone: PAIade 6-0400 (400)

Dear Sir:

We are enclosing herewith order blank in connection with cleaning of your ELECTRIC FURNACE-MAN and boiler. It has been our experience that the greatest amount of depreciation in heating plants is during the summer months especially due to rust and corrosion caused by damp coal and ashes remaining in the heating apparatus.

You, no doubt, are familiar with the necessity of cleaning your furnace annually after the fire is discontinued. The ELECTRIC FURNACE-MAN should also be cleaned - with particular attention to the following:

REMOVING all coal from the hopper, worm and fire pot;  
REMOVING all ashes from the ash worm and ash elevator;

GREASING and oiling all bearings as well as those parts subject to rust.

We shall be pleased to give you any further information on this subject that you may require, or, if you will fill out the enclosed blank, stating thereon any additional work that you may want, our service department will do this work for you and relieve you of any worry in connection with it.

The charge for this service is nominal, depending upon the time necessary.

Yours very truly,

AUTOMATIC COAL BURNER CORP.

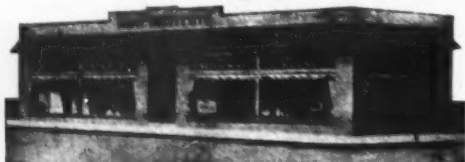
E. J. Decker,  
Treasurer.

EJD:ME

U.S. Unusual and difficult heating problems will receive our immediate attention - tell us about them.

## Automatic Coal Burner Company

HEATING EQUIPMENT



4836-38 HUDSON BOULEVARD, WEST NEW YORK, N. J.  
Telephone: PAIade 6-0400 (400)

Date.....19.....

You are hereby authorized to perform the following work in connection with my heating plant:

REMARKS:

1. Clean "Electric Furnace Man"
2. Oil and Grease same
3. Replace parts where necessary
4. Clean and scrape boiler or furnace
5. Clean flue pipe connecting boiler and chimney
6. Repair any defective insulation (asbestos)
7. Paint boiler doors and trim
8. Clean Thermometer points and oil motor

LIST OTHER ITEMS:

- 9.
- 10.
- 11.
- 12.

I would prefer having the above work done on or about.....19.....

Signed.....

Address.....

Telephone No. ....

NOTE: CROSS OFF ITEMS NOT WANTED. Use also Nos. 9, 10, 11, 12. Special accessories (see list) listed elsewhere for Thermometer, etc.

We are thankful to you as a user of the "Electric Furnace Man" for the continued increase in our business. Should you have acquaintances who have expressed their desire for an Electric Furnace Man, kindly list their names below.

Name

Address

Shall we mention your name YES - NO

Thank You

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*(Continued on page 104)*



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# Association ACTIVITIES

## Coming Conventions

1940

June 3-5—National Warm Air Heating and Air Conditioning Association. Mid-year Meeting. Palmer House, Chicago. Allen W. Williams, Managing Director, 5 East Long St., Columbus, Ohio.

June 13-14—The Sheet Metal Contractors' Association of Pennsylvania. Annual. Harrisburg. M. F. Liebermann, Secy., 1411 Merchant St., Ambridge, Pa.

## National

The Mid-Year convention of the National Warm Air Heating and Air Conditioning Association will be held June 3, 4 and 5 at the Palmer House, Chicago. President C. A. Olsen extends a cordial invitation to all manufacturers, jobbers and dealers in the industry to be present.

The Program Committee is completing a well-balanced list of subjects which will cover all phases pertinent to warm air heating—better merchandising and wider publicity, the latest developments from the Association's research work at the University of Illinois, and something special relative to gravity furnaces with ample time for general discussion of all. The program will be in line with the purposes of the association, which are research, engineering, merchandising, publicity and education. It will be of special interest to dealers.

The first day—June 3—will be devoted to a meeting of the organization's Board of Directors and Committee, with convention sessions on succeeding days.

A special committee of thirty from the Chicago district will feature an elaborate entertainment on Tuesday evening, June 4, and the association's annual golf tournament will be held on Wednesday afternoon.

The Chicago Convention Committee consists of T. Reid Mackin of International Heater Co. as chairman, to be assisted by J. Harvey Manny of the Robinson Furnace Co. and Ralph Blanchard of Hart & Cooley. Ed. Carter, editor of Snips is secretary of this committee and C. E. Price of American Artisan is treasurer.

Entertainment Committee: Robert Evans, Chairman, Sunbeam Heating Co.; Ned Cummings, L. J. Mueller Furnace Co.; Harry Cronin, Acme Furnace Fitting Co.; Fred Goodall, Williamson Heater Co.; Frank Hofer, Chicago Metal Mfg. Co.; Robert Mattingly, Henry Furnace & Foundry Co.; H. E. Oakes, Meyer Furnace Co.

Golf Committee: J. Harry Ebbert, Chairman, Armstrong Co.; Carl Andren, Forest City Foundries Co.; J. C. Carrol, American Radiator & Standard Sanitary Corp.; Don Grace, Chicago Steel Service Co.; Paul Kraft, Air Controls, Inc.; Ross Mahoney, Sheet Metal Worker; John Spitzer, Central Committee; R. Payne Wettstein, American Artisan.

Publicity and Finance Committee: Hugh Courteol, Chairman, The Mercoid Corporation; Roland Barlow, Industrial Training Institute; Walter Joy, Republic Metals & Roofing Materials, Inc.; Ray Lorenz, Chicago Furnace Supply Co.; Art Meiche, Chicago Filter Co.; Frank Myers, Owens-Corning Fiberglas Corp.; Lou Reining, Automatic Humidifier Co.; Grant Wilson, Grant Wilson, Inc.

Lou Schanz, advertising manager of The Mercoid Corporation, who helped the committee last year, has been drafted to duplicate this year and has some material in preparation.

## Pennsylvania Annual Program

The Sheet Metal and Roofing Contractors' Association of Pennsylvania, announces the following program for their Annual on June 13 and 14, at Harrisburg, with headquarters at the William Penn Hotel, 327 Market Street:

Following registration at 9:30 Thursday morning, and a Board of Directors Meeting at 10:00, the convention will be called to order at 11:00 a. m. by Chairman E. C. Reisinger.

Address of Welcome—Hon. Dr. Howard Milliken, Mayor of Harrisburg  
Response—A. J. Sabathné, President Sheet Metal and Roofing Contractors' Association of Pennsylvania  
Appointment of Credentials, Auditing and Resolutions Committees

Report of President

Address—C. H. Manion, Follansbee Bros. Co.

Thursday afternoon's program includes reports of the secretary, the treasurer, and standing committees:

Vocational Education—E. H. Reismeyer, Chairman

Trade Relation and Policy—Frank Schimpf, Chairman

Legislative—Louis Luckhardt, Chairman

Membership—J. D. Sprucebank, Chairman

Address—"What an Association Can Do for Its Members,"

H. S. Criswell, Secretary Salesmen's Auxiliary

"Who Is Your Competition?"—Open Discussion

Address and Pictures in Sound and Color—Carnegie Illinois Steel Corporation

On Friday morning the meeting will be called to order at 9:30, followed by a report of the nominating committee and nominations from the convention floor.

Address—"Correct and Incorrect Methods of Fabricating and Installing Duct Systems for Air Conditioning Work," J. H. Van Alsberg, Hart and Cooley Mfg. Co.

Address—"Prevention of Accidents by the Employer and Employee," Edgar H. Neibert, Workmen's Compensation Supv. of Commercial Inspection

On Friday afternoon at 1:30, the auditing and credential committees will report, followed by the election of officers.

Address—"Air Distribution," Herbert K. Kunen, Anemostat Corporation of America

Overhead Expense Committee—R. S. Hahn, Easton, Pa., and J. E. Davis, Pittsburgh

Address—"Useful Information on Galvanized Sheets, How They Are Made and How They Can Be Handled and Fabricated to Advantage," Nick Tiedeman, American Rolling Mill Co.

The banquet will be held Friday evening at 7:00 p. m. at the William Penn Hotel.

A. J. Sabathné, President.

## Chicago

An open meeting was held by the Furnace Air Conditioning and Sheet Metal Institute Thursday night, April 11th, at Rheingold Hall, 3159 Southport avenue. One of the featured speakers of the evening was Lou Reining of Automatic Humidifier Company, who discussed "Getting the Most Out of New and Old House Heating Jobs." He advised the dealers present to make the most out of their trips to the customers' basements, since, he said, many an extra dollar can be made by stressing and selling furnace accessories.

Gordon Carlson of Agatite Machinery Company gave a demonstration of the newest labor saving sheet metal working machinery and tools after the meeting.

Guests in attendance were Frank Mehrings of the Meyer Furnace Company and James Galloway of the Automatic Humidifier Company. There were several door prizes given, chief among which was an Automatic Humidifier.

Refreshments were served by John Novak's committee.



# Association Activities

## Oil Burner Institute Annual

Oil Burner Institute, 30 Rockefeller Plaza, New York City, held its annual meeting on April 2 at the Statler Hotel, Buffalo, and elected Ray G. Whipple of Harvey-Whipple president for the coming year. Mr. Whipple succeeds Frank H. Dewey of Gar Wood. Other officers elected were:



Ray G. Whipple

1st Vice President—E. P. Bailey (National Airoil).

2nd Vice President—J. H. O'Brien (Petro).

Secretary-Treasurer—C. F. Curtin.

C. E. Lewis (Delco) was elected to the Board of Directors for three years and other members re-elected to the Board for the same period are: Herbert Gillis (Branford), J. A. Lattner (Century), H. C. Little (H. C. Little), J. H. O'Brien (Petro), J. H. Van Sciver (Bethlehem Doe), and C. B. Tamm (Heil).

Members of the Executive Committee elected for the year are: E. P. Bailey, Frank H. Dewey, C. E. Lewis, M. A. Powers (Timken), A. F. Reif (Rexoil), F. H. Van Blarcom (Lynn) and Ray G. Whipple.

The next regular quarterly meeting of the Board of Directors will be held in July at Eastern Point, Conn.

## Toledo Code Report at Michigan Convention

In reporting the discussion of city codes at the Michigan convention (April, 1940, page 100) we garbled the remarks of Mr. H. C. Bitter in such a way that his recommendations were not exactly clear. Mr. Bitter said that the experience in Toledo proved conclusively that any heating code should be written completely so that there can be no mistaking the meaning. Also that it is illegal, in many cities, to incorporate in the city code sections which specify by referring to other codes. In other words, you cannot say: "In —, the regulations of the Technical Code of the National Warm Air Heating and Air Conditioning Assn. shall be followed." Instead these specifications from the Technical Code must be quoted in full in the city code.

Mr. Bitter goes on to say: "I know that an ordinance cannot be written to include anything which is not specifically stated therein. I cited the Columbus, Ohio, ordinance which permits reference to certain codes as a part thereof, and warned that unless the law department of Columbus permits what the Toledo law department would not permit, the Columbus ordinance will not hold water."

"I spoke in an 'advisory capacity,' particularly to those contemplating the drafting and adoption of a warm air heating ordinance. I urged that ordinances be drafted by the contractors or the contractors' association and cited Saginaw. There, last fall, when I talked at the Saginaw Valley Association banquet, I found that the city officials were thoroughly acquainted with the contents of their ordinance, but the members of the association were not."

We are glad to add this further report.

## Fox Valley

The Fox Valley Furnace & Sheet Metal Contractors' Association held their first open meeting at St. Charles, Illinois, during the past month with President Jack Stowell in charge, assisted by Vice Presidents George Bushman of Aurora and Wm. Wolfe of Elgin, secretary Alvin Lohbauer of Aurora, treasurer Andrew Lind of Dundee and Sergeant-at-Arms J. T. Morning of Hampshire.

The entertainment committee consisted of Messrs. Klinky, Reis, Conover, Lohbauer and Stowell.

Fred W. Dabel, vice president of the Merchant's National Bank of Aurora, talked on "How the Sheet Metal

Contractor Can Make More Home Owner Sales Through FHA," followed by questions and discussion.

Following the banker's discourse, the following made short talks: Hugh Courteol, president of Mercoid Corporation; Walter Joy of Republic Metals; Grant Wilson; Reid Mackin of International Heater Co.; Harry Ebbert of the Armstrong Co.; Mr. Lyon of the Marshall Furnace Co.; Lou Reining of Automatic Humidifier, and John Sheets of Messenger & Parks, Aurora.

## Florida

At the annual convention of the Roofing and Sheet Metal Contractors Association of Florida held at Orlando on April 12 and 13, the following officers were elected:

President—E. Mack Fillingham, Jacksonville  
1st Vice President—William Palmer, Miami  
2nd Vice President—Frank Tack, Clearwater  
Secretary-Treasurer—L. A. Burgess, West Palm Beach.

Convention speakers were:

Hon. S. W. Way, Mayor of Orlando  
Karl Lehmann of Lake County Chamber of Commerce and Chairman of Publicity Committee of Kiwanis International on the subject of "Organization and Co-operation"

John H. Faunce, American Rolling Mills, Middletown, Ohio, on "The Modern Trend of Roof Drainage"

W. O. Richards, Assistant Sales Manager, Lennox Furnace Co., Syracuse, N. Y., on "Modern Warm Air Heating Compared with Old Methods"

Karl Landgrebe, Vice President of Special Duties and Administrative Duties, Tennessee Coal, Iron and Railroad Co. on "The South and Possibility of Growth in Industrial Lines"

W. B. Alexander, Vice President of Waterman-Waterbury Co., Minneapolis, and Chairman of the Advisory Committee of the National Warm Air Heating and Air Conditioning Association, on "Research Work in Heating and Air Conditioning"

Both the City of Miami and the City of Jacksonville made a bid for the convention in 1941. The City of Jacksonville was chosen with the possibility that the 1942 convention will be in Miami.

The organization contemplates the publishing of a monthly bulletin in the interest of the association. Efforts to perfect the State organization and lower insurance rates will be made during the coming year.

L. A. Burgess, Secretary-Treasurer.

## Fan Manufacturers

The National Association of Fan Manufacturers, 5-208 General Motors Building, Detroit, Mich., at the Annual Meeting in Chicago, Illinois, on April 11, 1940, elected E. Szekely, President; H. Mathis, Vice President; and L. O. Monroe, Secretary-Treasurer for the ensuing year.

The next regular meeting of the Association is to be held at White Sulphur Springs, Virginia, Friday, June 14, 1940.

## Research for Bituminous Coal Industry

Bituminous Coal Research, Inc., an affiliate of the National Coal Association, 803 Southern Building, Washington, D. C., is sponsoring a co-operative program of scientific research for midwestern coal-producing companies as part of a nation-wide program.

Embodied in the program are the problems of smokeless hand-firing of coal, completely automatic residential heating, dustproofing of coal, railroad locomotive fuels, a standard smokeless index, modification of ash fusion characteristics and emission of solids from stokers.

The possibilities of residential heating with coal, minus the customary three-times-a-day firing and tedious removal of ashes, requires the development of stokers with both automatic bin-feed and ash removal. The equivalent in a gasification unit, whereby the coal can be converted into the gaseous form, which is most suitable for many uses, is another possibility.

Improved, low-priced stoves and better central heating furnaces are proposed for burning high volatile coal smokelessly, where coal is hand-fired in residences and small buildings. The production of fly ash and smoke with conventional residential stokers is to be thoroughly investigated for possible means for its complete elimination.

# New PRODUCTS

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 114 and mail to us.

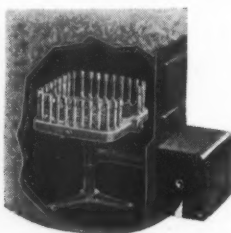
● Indicates product not listed in 1940 Directory.

△ Indicates manufacturer not listed in 1940 Directory.

## ▲62—Conversion Gas Burner

The Dalzen Manufacturing Company, 511 Leib Street, Detroit, Michigan, announces a Multi-Tip conversion gas burner which offers flexibility to the heating contractor.

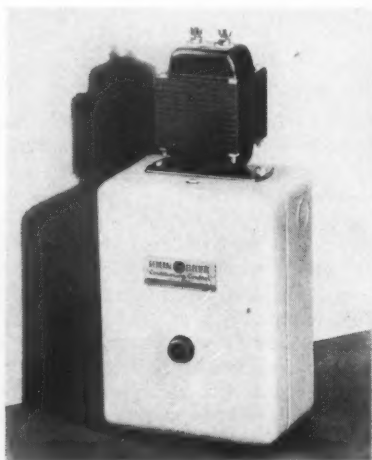
Each tip is a gas burner requiring



at normal pressure, approximately 3,000 Btu input. Thus when balancing input to heat loss, the proper number of tips is used to secure the required input at normal pressure. The unit includes thermostatic controls and automatic thermopilot.

## 63—New G-E Control

General Electric Company, 1 River Rd., Schenectady, New York, announces a new magnetic switch for control of air-conditioning equipment motors directly from the contacts of a room thermostat or other low-voltage control instrument. This unit, which



has application in most situations where it is desirable to control air-conditioning equipment motors from a thermostat, consists of a three-pole magnetic switch mechanism, overload relays, and a low-voltage control transformer into one compact unit.



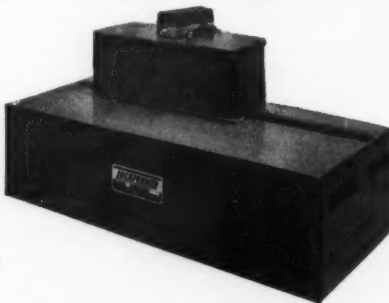
## 64—Larger Pillow Block

Randall Graphite Products Corporation, 609 W. Lake St., Chicago, has developed and announces a new larger pillow block for shafts of 1½ to 1¾ in diameters.

The assembly consisting of three parts—the one-piece steel housing, a new machined cast iron ball with large oil reservoir, and a patented bronze bushing with graphite filled grooves to provide ample lubrication—is cadmium plated to resist corrosion.

## 65—Lockformer 24

The Lockformer Company, 4615-17 Arthington St., Chicago, announces Lockformer 24, a portable or bench model for making Pittsburgh locks. The Lockformer 24 handles 24 gauge



or lighter material, plugs into an ordinary electric light socket, and weighs 150 pounds.

Also new, and offered as optional equipment is the power flanger attachment, which may be installed at the factory or purchased later. With this attachment, the "24" is a dual purpose machine, making both the Pittsburgh Lock as well as its necessary adjunct, the right angle flange.

One piece Pittsburgh Lock rolls, gears and shafts, with shafts hardened and ground, forming rolls case hardened, are also incorporated in the new "24."

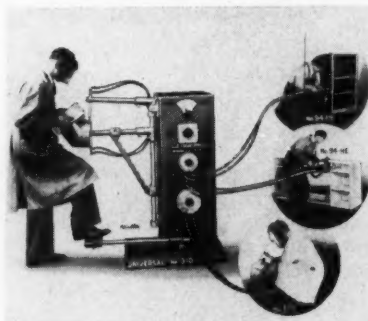
## ▲66—Multi-Zone Conditioner

Micheli Air Conditioning Co., Inc., 1725 State Street, Schenectady, N. Y., is offering the Micheli multi-zone conditioner, a complete air conditioning unit for homes, stores, apartment buildings, garages, restaurants, etc., with built-in zone control for cooling or heating. Present systems have only one thermostat.

The conditioner may be combined with a steam or hot water system for winter air conditioning of all or part of the building. Complete year around air conditioning is available at any time by the addition of standard refrigerant coils and the installation of a condensing unit. Cooling may also be effected through this unit by adapting it to a steady supply of cold water.

## 67—Universal Spot Welder

The Eisler Engineering Company of 740 S. 13th St., Newark, N. J., has recently developed Universal welder No. 310, similar to a standard 10 KVA spot



welder with sliding horns, adaptable for all kinds of sheet metal work—spot welding, push welding, gun welding and arc welding. The machine is supplied with individual controls.

## ●68—Two Soot Removers

Tamms Silica Co., 228 N. La Salle St., Chicago, announces two new products designed to remove soot deposits from furnaces, stoves and oil burner equipment without the use of wire brushes, vacuum cleaners, or any tools.

Soot removers consist of packages of chemical material, encased in cardboard, which are placed on top of the coal-bed and consumed in about five minutes. As the material burns it transforms the soot deposited in flues, firepot, pipes, etc., to a white powdery ash that passes through the chimney.



# New Products . . . . .

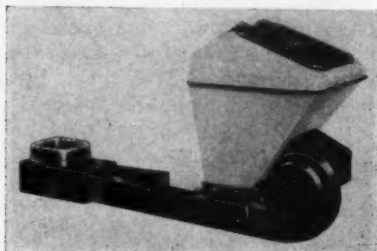
For your convenience in obtaining information regarding these items, use coupon on page 114.

## 69—Firetenders

Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Indiana, announces three new low-priced Fire-Tender stoker models—retaining the outstanding quality features, including the "Economixer."

The hopper is heavy gauge rust resisting steel, welded, with a capacity of 300 pounds.

The drive unit is of the constant feed type and has 6 gears—one worm and



worm wheel, and 4 spur gears. Oil from a top reservoir in drive unit keeps all parts lubricated. A Protecto-Switch turns off the electric current when the Fire-Tender becomes overloaded.

The fan is oversize, and the housing is rigidly bolted to the motor bracket.

The retort is polished, is rectangular and narrow.

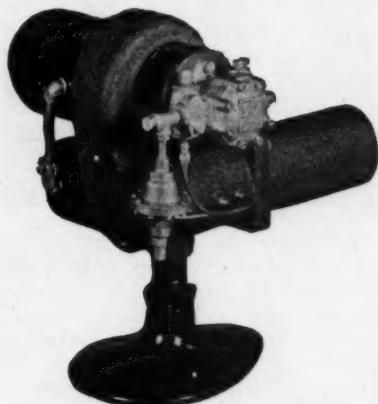
The tuyeres are of the self-cleaning type, overlapping, narrow and ribbed.

The controls are—room thermostat; electric hold fire relay, and a limit control.

Specification sheets are available.

## 70—Model EMB Burner

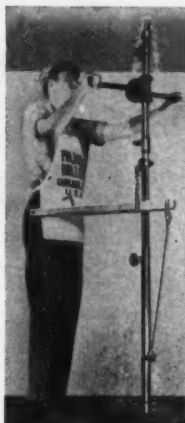
Scott-Newcomb, Inc., 1922 Pine Street, St. Louis, has developed a new pressure type of oil burner—Model EMB—to burn No. 3 or even No. 4 oil.



The nozzle orifice is equivalent in size to a 3-gallon per hour pressure oil burner, and only one nozzle is used from ½ gallon to 3 gallons. A screw adjustment sets the burner at ½ gallon per hour, ⅞, ¾, ¾, ¾, etc.

## ▲71—Spring Hammer

Phillips Drill Company, 4700 W. 5th Ave., Chicago, offers the Phillips improved spring hammer plus the expansion shield that drills its own hole—designed primarily as a floor to ceiling tool, for drilling upward holes and installing self-drilling expansion shells in concrete ceilings.



## 72—Low-Priced Stoker

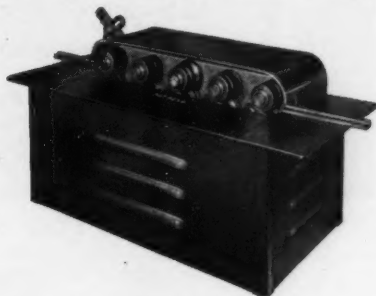
Link-Belt Company, 2410 W. 18th St., Chicago—Stoker Division—has released pictures and data on a new model stoker, the "Challenger."



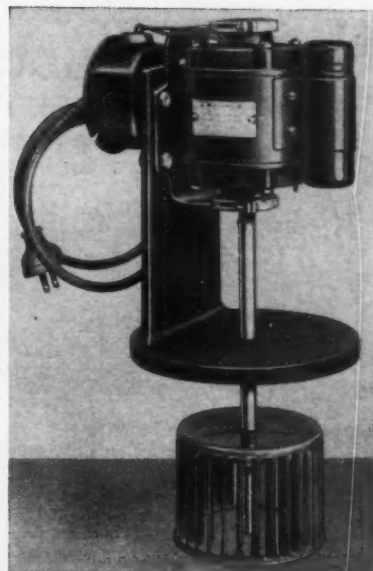
The "Challenger" supplements the Link-Belt stoker line and includes the Link-Belt selling features such as automatic Air-Meter, Load-Signal (no shear pin) motor protection, baked on finish in two tones, heavy hopper construction, etc. Capacity 25 lbs. per hour.

## 73—Portable Rolling Machine

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able for Double Acme, Drive Cleat and Right Angle formations. To combine strength with light weight, the "Portable" is built of steel with a head of special alloy.



## ●74—Magic Wheel Circulator

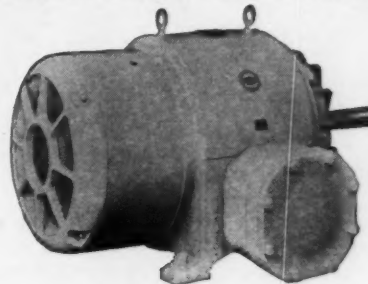
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The wheel is mounted in the center of the furnace dome by cutting a 5 in. hole in the top of the furnace and putting the fan through this hole and setting the plate on top. The plate is equipped with a thick asbestos pad and the weight of the motor and frame holds the fan in place without riveting or bolting.

The blower wheel delivers from 200 to 300 cfm over a circumference of 360 degrees. The principle of circulation is to draw the cold air from the bottom and sides of the furnace into the center of the furnace over the highly heated fire pot and then distribute it.

## 75—Explosion Proof Motors

U. S. Electrical Motors, Inc., 200 E. Slausson Ave., Los Angeles, now offers higher horsepower explosion proof motors. In Class I Group D Explosion Proof Motors, approved by National Board of Fire Underwriters,



the ratings have been increased from 25 to 75 HP, while in Class II, Group G, they have been increased from 7½ to 75 HP.

The larger motors are of the shell type frame construction and have a specially designed fan which is quiet at high speeds. Wiring is made more convenient with a new larger terminal box.

# New PRODUCTS

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 114 and mail to us.

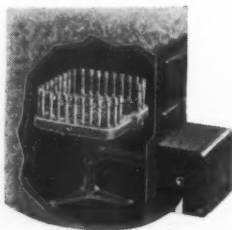
● Indicates product not listed in 1940 Directory.

△ Indicates manufacturer not listed in 1940 Directory.

## ▲62—Conversion Gas Burner

The Dalzen Manufacturing Company, 511 Leib Street, Detroit, Michigan, announces a Multi-Tip conversion gas burner which offers flexibility to the heating contractor.

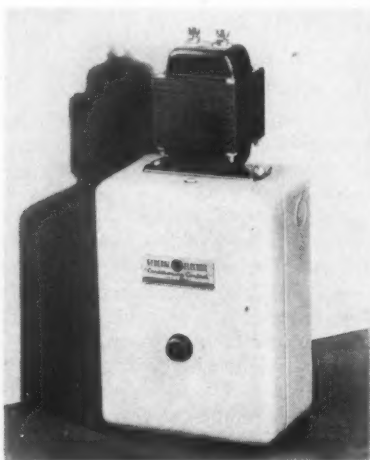
Each tip is a gas burner requiring



at normal pressure, approximately 3,000 Btu input. Thus when balancing input to heat loss, the proper number of tips is used to secure the required input at normal pressure. The unit includes thermostatic controls and automatic thermopilot.

## 63—New G-E Control

General Electric Company, 1 River Rd., Schenectady, New York, announces a new magnetic switch for control of air-conditioning equipment motors directly from the contacts of a room thermostat or other low-voltage control instrument. This unit, which



has application in most situations where it is desirable to control air-conditioning equipment motors from a thermostat, consists of a three-pole magnetic switch mechanism, overload relays, and a low-voltage control transformer into one compact unit.



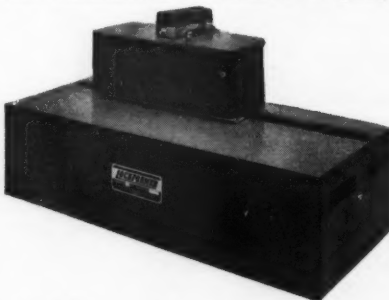
## 64—Larger Pillow Block

Randall Graphite Products Corporation, 609 W. Lake St., Chicago, has developed and announces a new larger pillow block for shafts of 1 1/2 to 1 3/4 in diameters.

The assembly consisting of three parts—the one-piece steel housing, a new machined cast iron ball with large oil reservoir, and a patented bronze bushing with graphite filled grooves to provide ample lubrication—is cadmium plated to resist corrosion.

## 65—Lockformer 24

The Lockformer Company, 4615-17 Arthington St., Chicago, announces Lockformer 24, a portable or bench model for making Pittsburgh locks. The Lockformer 24 handles 24 gauge



or lighter material, plugs into an ordinary electric light socket, and weighs 150 pounds.

Also new, and offered as optional equipment is the power flanger attachment, which may be installed at the factory or purchased later. With this attachment, the "24" is a dual purpose machine, making both the Pittsburgh Lock as well as its necessary adjunct, the right angle flange.

One piece Pittsburgh Lock rolls, gears and shafts, with shafts hardened and ground, forming rolls case hardened, are also incorporated in the new "24."

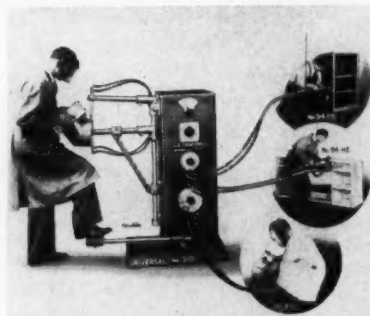
## ▲66—Multi-Zone Conditioner

Micheli Air Conditioning Co., Inc., 1725 State Street, Schenectady, N. Y., is offering the Micheli multi-zone conditioner, a complete air conditioning unit for homes, stores, apartment buildings, garages, restaurants, etc., with built-in zone control for cooling or heating. Present systems have only one thermostat.

The conditioner may be combined with a steam or hot water system for winter air conditioning of all or part of the building. Complete year around air conditioning is available at any time by the addition of standard refrigerant coils and the installation of a condensing unit. Cooling may also be effected through this unit by adapting it to a steady supply of cold water.

## 67—Universal Spot Welder

The Eisler Engineering Company of 740 S. 13th St., Newark, N. J., has recently developed Universal welder No. 310, similar to a standard 10 KVA spot



welder with sliding horns, adaptable for all kinds of sheet metal work—spot welding, push welding, gun welding and arc welding. The machine is supplied with individual controls.

## ●68—Two Soot Removers

Tamms Silica Co., 228 N. La Salle St., Chicago, announces two new products designed to remove soot deposits from furnaces, stoves and oil burner equipment without the use of wire brushes, vacuum cleaners, or any tools.

Soot removers consist of packages of chemical material, encased in cardboard, which are placed on top of the coal-bed and consumed in about five minutes. As the material burns it transforms the soot deposited in flues, firepot, pipes, etc., to a white powdery ash that passes through the chimney.



# New Products . . . . .

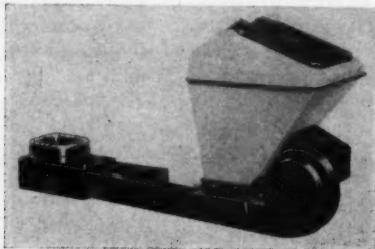
For your convenience in obtaining information regarding these items, use coupon on page 114.

## 69—Firetenders

Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Indiana, announces three new low-priced Fire-Tender stoker models—retaining the outstanding quality features, including the "Economixer."

The hopper is heavy gauge rust resisting steel, welded, with a capacity of 300 pounds.

The drive unit is of the constant feed type and has 6 gears—one worm and



worm wheel, and 4 spur gears. Oil from a top reservoir in drive unit keeps all parts lubricated. A Protecto-Switch turns off the electric current when the FireTender becomes overloaded.

The fan is oversize, and the housing is rigidly bolted to the motor bracket.

The retort is polished, is rectangular and narrow.

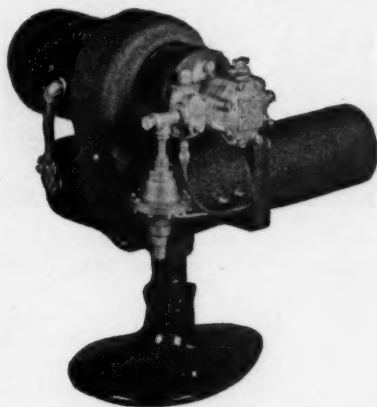
The tuyeres are of the self-cleaning type, overlapping, narrow and ribbed.

The controls are—room thermostat; electric hold fire relay, and a limit control.

Specification sheets are available.

## 70—Model EMB Burner

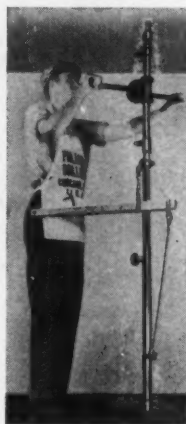
Scott-Newcomb, Inc., 1922 Pine Street, St. Louis, has developed a new pressure type of oil burner—Model EMB—to burn No. 3 or even No. 4 oil.



The nozzle orifice is equivalent in size to a 3-gallon per hour pressure oil burner, and only one nozzle is used from ½ gallon to 3 gallons. A screw adjustment sets the burner at ½ gallon per hour, ⅞, ¾, ⅜, etc.

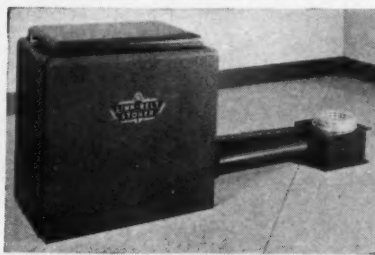
## ▲71—Spring Hammer

Phillips Drill Company, 4700 W. 5th Ave., Chicago, offers the Phillips improved spring hammer plus the expansion shield that drills its own hole—designed primarily as a floor to ceiling tool, for drilling upward holes and installing self-drilling expansion shells in concrete ceilings.



## 72—Low-Priced Stoker

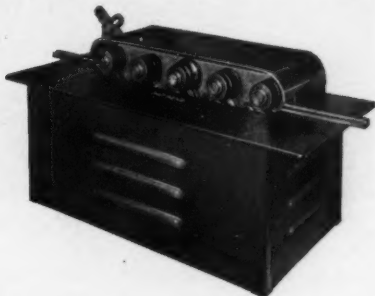
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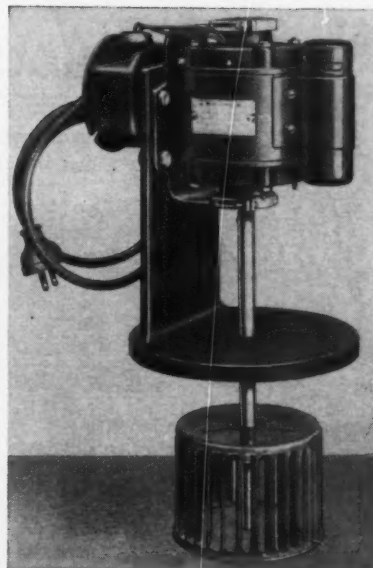
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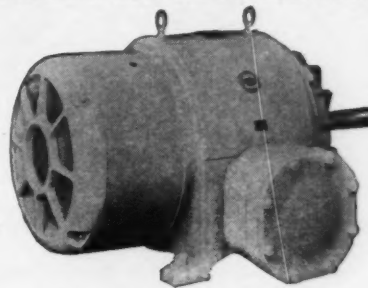
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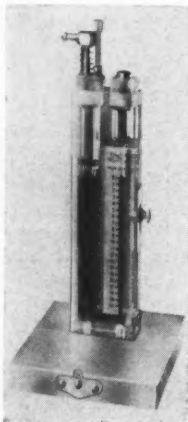
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# New Products . . . . .

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## 76—Pocket CO<sub>2</sub> Indicator

F. W. Dwyer Manufacturing Company, 565 West Washington Blvd., Chicago, announces a new No. 800 Dwyer pocket CO<sub>2</sub> Indicator, with unbreakable transparent plastic construction, carrying case with built-in compartments for draft-gage and thermometer, and self-closing valves eliminating the possibility of losing absorbent solution.



## 77—Fluid Heat Conditioner

Anchor Post Fence Co., Fluid Heat Division, Eastern Ave. & Kane St., Baltimore, Maryland, announces a new air-conditioning furnace designed to fit the heating requirements of small homes. The maximum capacity is 80,000 Btu at bonnet. Two blowers are available of 750 cfm and 1000 cfm.

The oil burner employed is the Fluid Heat Model P-30, flange mounted to



the exchanger, making for a compact unit—47-in. long, 24 in. wide, and 45½ in. high. Including its 9 x 12 in. factory built combustion chamber, the shipping weight is 675 lbs. Primary heating surface of the exchanger is built of 7-gauge steel plate and totals 18 sq. ft. Secondary heating surface is 12 ga. and total 16⅓ sq. ft.

The smoke pipe is 8 in. in diameter and return air passes around it. Standard controls include the Fluid Heat "Magic Hand." Filters are two in number and measure 10 x 20 x 2 in.



## 78—Power-Flow Ventilator

DeBothezat, Ventilating Equipment Division of American Machine and Metals, Inc., East Moline, Illinois, announces the Power-Flow roof ventilator, offering a large volume of air per horsepower while maintaining low tip speeds. Special aerodynamical design of the fan blades assures uniform velocity of air over the entire working face of the fan. Non-overloading power characteristics protect against burned out motors. Entrance eddy losses are reduced to a minimum by new patented "Log Cone" entrance ring.

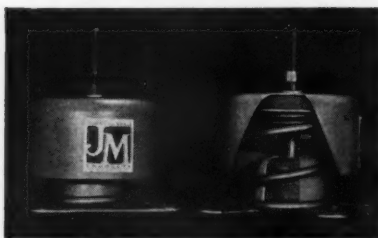
## 79—No-Sag Filter Pads

Utility Fan Corporation, 2201 Dwyer Ave., Los Angeles, is featuring "No-Sag" filter pads in their 1940 line of Utility Air Coolers, on which they have been granted nine patent claims under U. S. Patent No. 2,182,501.

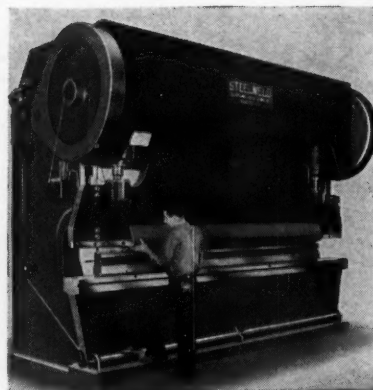
The pad rack is a rectangular metal frame, with a grid of stiff wire that projects in U-shaped barbs through the filter pad, to prevent slipping or sagging when saturated with water.

## 80—Machine-Vibration Isolator

Johns-Manville, 22 East 40th St., New York City, announces a new, easily installed vibration isolator, designed to economically control machine vibration and reduce noise.



The J-M controlled spring isolator was developed for use on the basis of motors, generators, pumps, ventilating fans and similar equipment. The working parts consist of a coil spring and a rubber load pad, which support the equipment and isolate vibration, and an adjustable rubber snubber inside the base, which controls excessive motion.



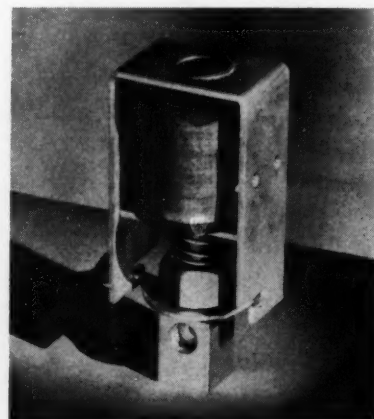
## 81—Model J-12 Press

The Steelweld Machinery Div., of The Cleveland Crane & Engineering Company, Wickliffe, Ohio, announces the addition of Model J-12 to their line of Steelweld bending presses, designed to handle plates up to 12 feet by ⅝ in. between housings and up to 14 ft. over total length of bed and ram.

The J-12 has a one-piece all-welded frame. The ram is operated by two eccentrics, one on each side of the machine. Each eccentric is provided with three extra large main bearings and an eccentric bearing. The bearings are automatically lubricated by two oiling units mounted on either end of the machine. All gears are protected with metal covers and shafts located at rear of machine away from possible damage of crane hooks and bent-up plates.

## 82—G-E Solenoid Valve

General Electric Company, 1 River Rd., Schenectady, New York, announces a new, inexpensive solenoid valve particularly adapted to the re-



quirements of the heating and air conditioning industry as well as to general applications in the control of air, oil, water, and gas. It may be used as water control for humidifiers, for laundry and dishwasher equipment, oil shutoff for oil burner service, pilot-gas control for gas burners, air control for compressed-air devices, or for evaporative cooling equipment.

Since it is designed to be incorporated into an assembly that has its own enclosure, no coil cover, conduit plate, etc., have been provided.



## CHAR-GALE "Seal-Tite" REGISTER

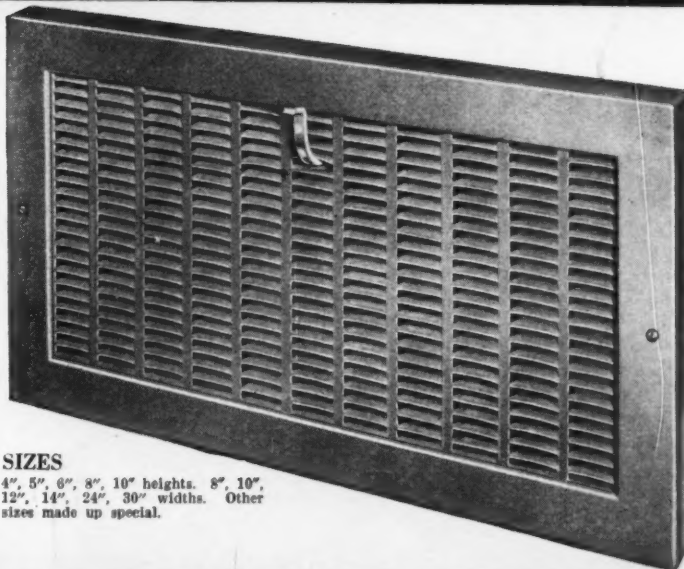
**A Quality Streak-Proof  
Register at a LOW Price!**

The CHAR-GALE "Seal-Tite" REGISTER completely eliminates wall streaking. It pleases your customers, saves your time and cuts installation costs. Our exclusive flexible packing member is an integral part of the back frame. Handsome in appearance—maximum capacity—air flow directed for comfort without drafts. Baseboard and sidewall types.

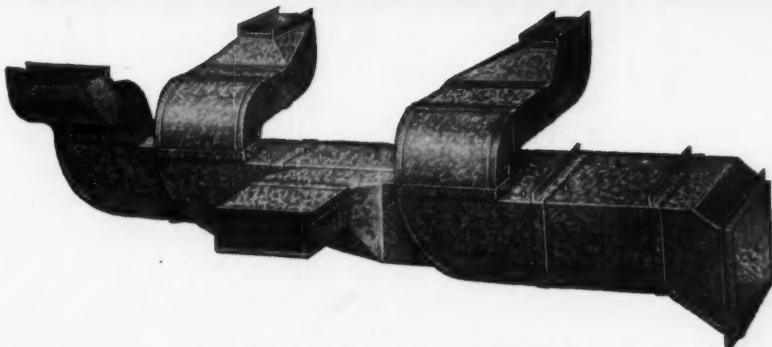
**YOUR JOBBER CAN SUPPLY YOU  
AT A NEW LOW PRICE.**

### SIZES

4", 5", 6", 8", 10" heights. 8", 10", 12", 14", 24", 30" widths. Other sizes made up special.



## CHAR-GALE "Pre-Fabricated" DUCTS AND FITTINGS



You can make extra profits with CHAR-GALE "Pre-Fabricated" DUCTS and FITTINGS, which will handle your jobs practically 100% complete. Made by standardized mass production methods—all sizes are accurate—no delays on the job. Your Jobber Can Supply You.

**Already Engineered to Save You  
Time and Trouble**

Our fittings automatically take care of the engineering for you. The Char-Gale "Quick-Method" Chart gives accurate sizes for any job, and figures costs for you. Our Drafting Department will gladly make your plans free of all charges. Try us out on your next job. You'll be delighted with results.

## CHAR-GALE REPLACEMENT CASING

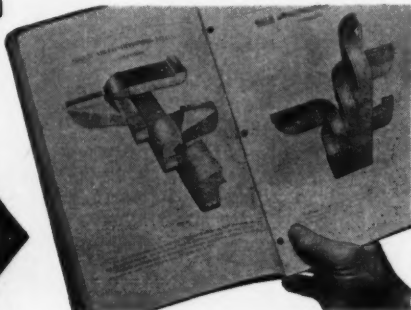
**A New Source of Profits in Modernizing Basements**

You know many a home owner who would like to modernize his basement, yet his heating plant has many years of service left in it and is too good to discard. A Char-Gale Replacement Casing will make his unit look as modern as the newest—at a price he'll like. It is tailor-made to fit any size or style of warm air heating plant. Strongly built, beautifully finished, easy to install. It increases property values and adds living space for your customers—and gives you a big new source of extra profits!

**Write for CATALOG No. 40**

Investigate this new merchandising idea at once. Write for catalog giving full details, and prices. It also shows the Char-Gale complete line of Pre-Fabricated Ducts and Fittings, and Air Conditioning Registers.

**THIS BOOK  
WILL SAVE YOU  
MONEY**



### CHAR-GALE MANUFACTURING CO.

3125 Hiawatha Ave., Minneapolis, Minn.

Please send me Catalog No. 40. I am interested in:

- ☐ CHAR-GALE "Seal-Tite" REGISTERS
- ☐ CHAR-GALE "Pre-Fabricated" DUCTS
- ☐ CHAR-GALE Replacement Casing

Name .....

Address .....

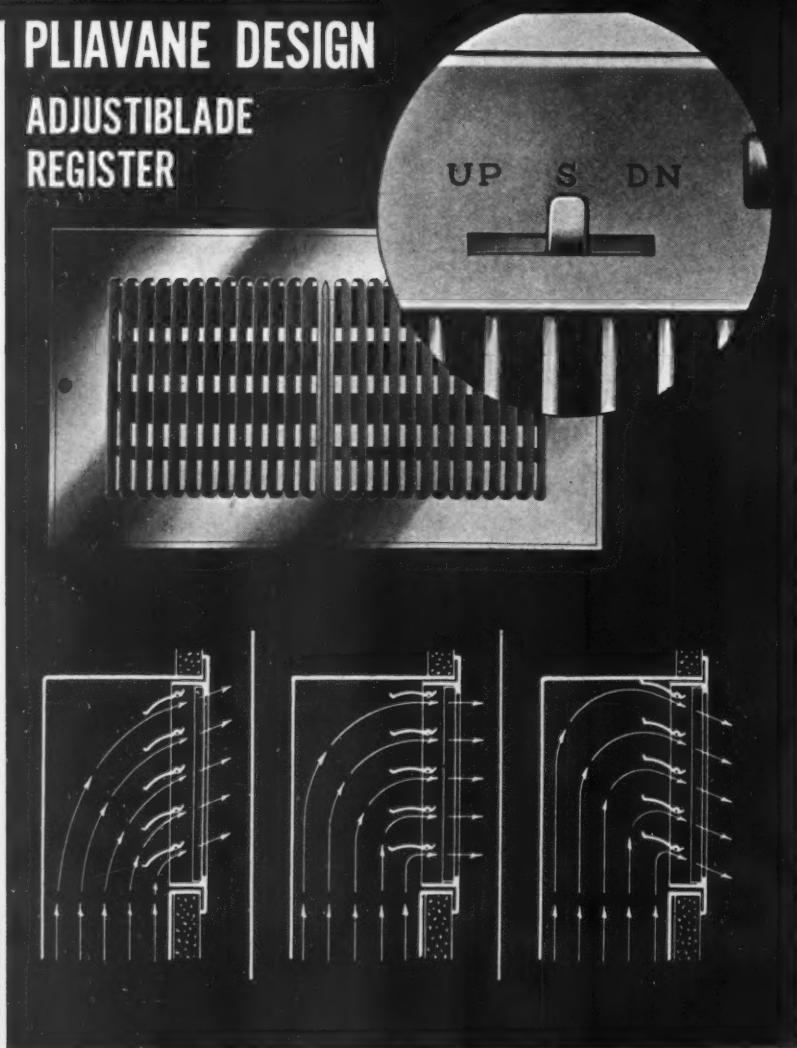
City .....

State .....

JOBBER'S NAME .....

## PLIAVANE DESIGN

### ADJUSTIBLADE REGISTER



## GOES THE AIR!!

Adjustment of the regulator on the face of this new register allows you to set the movable back blades so that the air flow can be deflected 20° up, 20° down or straight ahead. Sideways deflection is accomplished by bending the face bars individually to any desired angle by means of a small tool supplied with each register. Here is a register that will meet every installation requirement. Made only in the sixteen most commonly used sizes, this amazingly flexible register, because of volume manufacture, has been priced low enough to allow its use on every job. Investigate now.

### NEW CATALOG JUST OFF THE PRESS!

Send at once for Section No. 1,  
Catalog No. 40 just off the press.



**TUTTLE & BAILEY, Inc.**

NEW BRITAIN,

CONN.

NEW YORK

CHICAGO

PHILADELPHIA

## 1940's Building Prospect

(Continued from page 80)

finance, industry, and man-power necessary for conduct of our war participation might lead to permanent changes in our political, economic, and social institutions. This nation is now determined to profit by its past experience, to view all factors realistically, and to consider their long-range implications; it is set to use every means in its power to prevent history from repeating itself in the United States.

Our economic system itself has not stood still since 1914; in fact, many changes have taken place. We have become a creditor nation, we have experienced the unprecedented boom of the 1920's and the great depression of the 1930's; marked changes have taken place in the rate of population growth and industrial expansion. Our banking system has been greatly modified, our Federal Reserve System, a struggling infant in 1914, has grown to adult stature; mortgage finance is being transformed from the pawnbroking system characteristic of the horse-and-buggy era into a modern long-term credit system. At the moment, we have surpluses of raw materials, industrial plant capacity, and man-power. In consequence of all these facts, we cannot follow the easy path of plotting curves parallel to those of the World War period in estimating the course of construction activity in the near and in the more distant future.

### Election Year Uncertainties

In addition to the overshadowing uncertainty of the war, we have the domestic uncertainty of a presidential election year and the very important question of whether President Roosevelt will be nominated for a third term and, in case he is, whether he will be reelected. Consequently, continuation of construction industry recovery in 1940 has been considered as proceeding on a very moderate scale. These uncertainties are serious, and can only be resolved by the events of the coming months.

However, it seems to me that it is time for American business men and leaders in the building industry to conquer the spirit of defeatism that has been so prevalent. The economic changes of the past twenty years have been vast and far-reaching, and the adjustments that have been required in the past ten years have been equally far-reaching and have been rather painfully worked out; some of them have been worked out well, some incompletely, and some badly. That is the way things are done in a democracy. In 1932, the country cried out for strong personal political leadership, and got it. Recently, it has seemed necessary to many people that over-centralized



## Eleven Good Reasons For Using DETROIT AIR FILTERS

(Formerly the Arco Air Filter)

1. Exceptional cleaning efficiency—90% dust removal.
2. Economy—service life is long—costs less than many filters, no more than others.
3. Initial efficiency retained longer than in other filters.
4. Very low air resistance—no spot clogging.
5. High dust capacity, hence longer service life.
6. May be used in any position—will not warp or sag.
7. Rigid construction—does not pull apart when removed for replacement.
8. No particles of adhesive or filter material can be picked up by the air stream.
9. Odorless—and remains tacky at 10°—will not drip at 180°.
10. Air stream leaving the filter may be directed by the filter itself.
11. Serves as an effective sound deadener.

The Detroit Air Filter is made of two 45° cross section slices of corrugated board, placed together so air passing through must make a right angle turn. The dust catching fluid, impregnated in the fiber, grabs the dust as it goes by. • Write for descriptive bulletin.

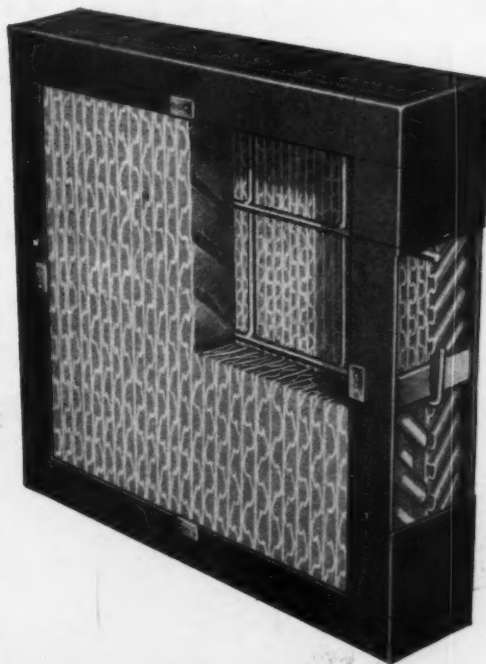


**DETROIT LUBRICATOR COMPANY**

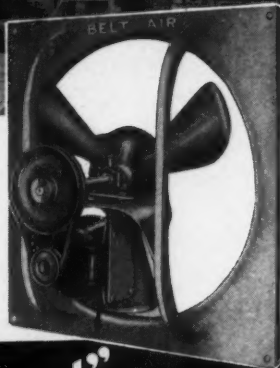
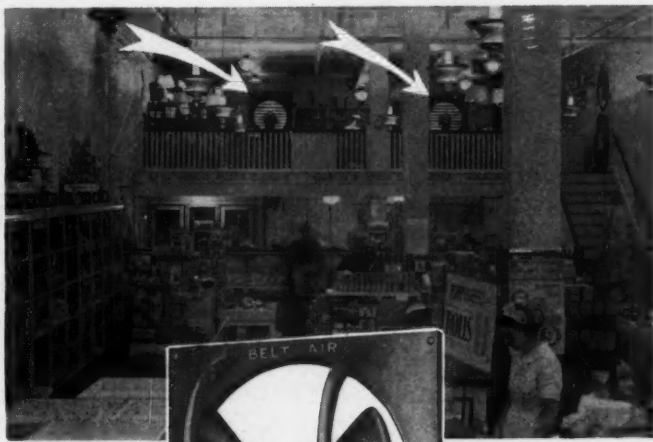
General Offices: DETROIT, MICHIGAN

Canadian Representatives: RAILWAY AND ENGINEERING SPECIALTIES LIMITED

Montreal • Toronto • Winnipeg



## Tell 'em about "BELT-AIR" Fans



"Belt-Air" fans are ideally suited for retail store ventilation.

### when Your Customers Want Good, Low Cost Ventilation

These new "Belt-Air" Fans have been especially designed to provide large capacity ventilation at low installation and operating costs. The special V-belt drive and design of the fan blades assures unusually quiet operation.

Fans are built in five sizes and have capacities ranging from 4,000 c.f.m. to 17,000 c.f.m. Fans are mounted in square panel for easy installation.

Write for Bulletin 3222.

**BUFFALO FORGE COMPANY**

497 Broadway

Buffalo, N. Y.

Branch Engineering Offices in Principal Cities  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

*Buffalo*

**BELT-AIR FANS**

## STOKER-OLA *is* EASIER TO SELL!

And no repeated service calls gnaw into anticipated profits and reduce customer satisfaction. Profits "stay put."

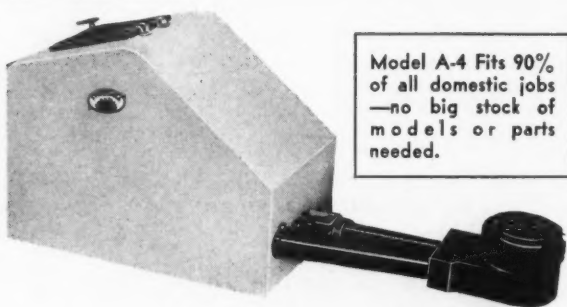
STOKER-OLA has every fundamental of other stokers: standardized controls, motor, conveyor, etc., plus eye-appeal—

*and, in addition, it offers that outstanding and easily demonstrated construction feature that appeals instantly to every prospect:*



### *Stoker-Ola's Patented Gearless Drive*

without a single gear-tooth to wear out or make a noise. And, aside from meaning that "NO GEARS MEAN MORE YEARS" this remarkable feature offers unlimited coal-feed settings—and it is the prime feature around which you can present a most convincing sales argument that includes these other features: (1) More Power; (2) Only Two Major Working Parts; (3) No Oil Changing and (4) A 3-Year Guarantee!



*and, best of all,  
is Stoker-Ola's price!*

If you feel that the above represents the kind of a stoker you want to sell, a request will bring you full details.

**ADVANCE APPLIANCE CO.**  
810 S. Washington St. Peoria, Illinois

power should be curbed; as a result, we have seen Congress gradually asserting its power and prerogatives, curbing administrative excesses and extravagance. To me, this is evidence that the United States is still a healthy, going concern. That it should be so is the vitally essential factor for continued recovery of construction.

## Konzo-Office Building Cooling

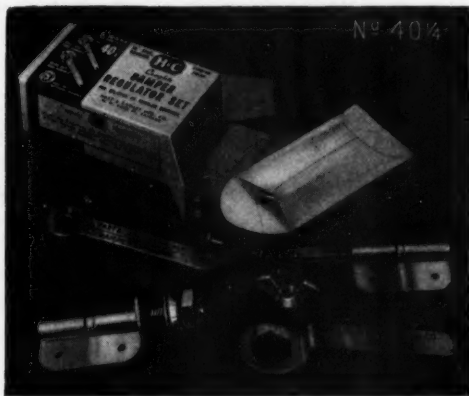
(Continued from page 49)

for the winter and the main return damper set for winter heating. In late spring the compressor is prepared for summer operation and dampers set for summer cooling. The adjustment of the main return dampers is by manual operation. Hence, some difficulty has been experienced during late spring and late autumn, when cool days and hot days alternate. Entirely automatic operation of the main fan dampers would be the only satisfactory solution for this condition, which exists for a period of a week or two in spring and autumn.

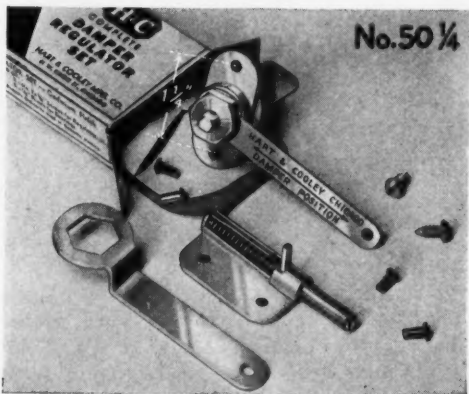
### General Observations

- 1—A year around air conditioning system requires careful engineering, particularly with respect to proper air distribution of the cooled air.
- 2—It is possible by proper design to use the same fan speed for summer and for winter. In an installation where the rooms are few in number and are open to each other, it is possible to avoid even the necessity for changes in the damper setting between seasons.
- 3—The installation of the condensing unit and cooling coils should be the responsibility of an experienced refrigeration man who is solely responsible for the operation of the cooling equipment.
- 4—In an overhead duct system as described, adequate duct insulation is absolutely necessary.
- 5—The only defect in this system, consisting of the use of ceiling registers, could have been avoided if the builders had called for heating bids before the building construction was begun. It is the duty of the heating contractor to emphasize this point to architects and builders.
- 6—The use of an individual air filter in the fresh air duct is excellent practice and will avoid later service calls resulting from clogging of the cooling coil surfaces with dirt.





**ECONOMY TYPE** *Quality at a Price!*  
Furnished with both wing and hex lock nuts.  
Made only with 1/4" Bearings. No. 40 1/4—List Price 30c Set  
May also be had with snap end bearing.  
No. 40 1/4 S—List Price 32c Set

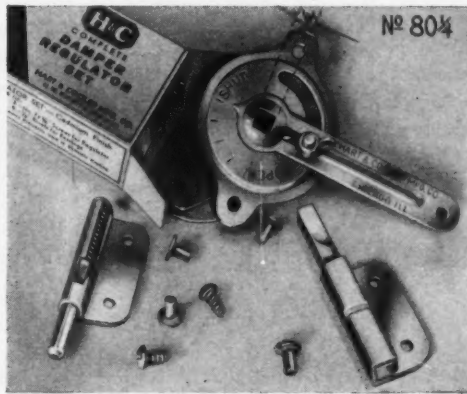


**BRACKET TYPE (left)**

With 1/4" Bearings—No. 50 1/4  
—List Price 40c Set  
With 3/8" Bearings—No. 50 3/8  
—List Price 60c Set  
1/4" size has snap end bearing.

**DISK TYPE (right)**

With 1/4" Bearings—No. 80 1/4  
—List Price 40c Set  
With 3/8" Bearings—No. 80 3/8  
—List Price 60c Set  
1/4" size has snap end bearing.



## H&C DAMPER REGULATOR SETS

### *Pick the Type that Suits you Best!*

H&C offers four different sets, three of which, in the 1/4" size, are furnished with snap end bearing to permit the installation of even the smallest dampers without bending. All are quality sets in every detail with all parts rust-proofed; all are equally adaptable to splitter or regular dampers. See your Jobber or write for sample and descriptive literature.

### **HART & COOLEY MANUFACTURING CO.**

**HOLLAND, MICHIGAN - - Chicago Office at 61 W. Kinzie Street**



Quick trigger release speeds up roll forming operations . . . upper slip roll swings forward horizontally for easy operation without lifting.

Write for Catalog 94

**NIAGARA MACHINE & TOOL WORKS**  
BUFFALO, N. Y.

BRANCHES: NEW YORK CLEVELAND DETROIT

## Kruckman's Washington Letter

(Continued from page 38)

more than \$10,000 each. Its officers have said they could build double the miles of highways constructed by the WPA, and at the same time guarantee to pay for the same number of man-hours employment, also pay the Social Security taxes and all the other taxes exacted by both Federal, State and local Governments, and show a profit.

### AGC Fights WPA

The Associated General Contractors, according to Government sources, has organized its affiliations in all States to wage a determined fight against further encroachments by WPA. It may be said in passing that during the next seven, eight months, every power of the Federal Government will be focussed on making the WPA operations as widely and as variously operative as may be accomplished under the law. It is considered probable that the extent of WPA operations will probably be restricted mainly by public sentiment and the vigilance of the political opposition.

Meanwhile, our own Federal spend-

ing, plus the spending by the Allies in this country, is said to gross about a billion dollars monthly. A large part of this is reflected in expansion of plants and modernization of business buildings and building of homes in the Eastern centers where tool industries and similar activities are located. The demand of the Allies as well as our own demand for war materials is expected to increase rapidly. The Bureau of Agricultural Economics, usually cautious and reliable, predicts a general boom this summer and marked increase in home building. Greatest industrial activities are predicted in Oklahoma, Colorado, Eastern Pennsylvania, Southern California, Northeastern Pennsylvania, Michigan, Illinois, and Ohio. Good business, perhaps not so active, is predicted in the District of Columbia, Kentucky, New England, Missouri, New York, Northern California, the Southeast and Texas. A modest decline is forecast in Utah, Western Pennsylvania, Minnesota, New York City and Iowa.

### Construction Investigation

The Department of Justice intimates that its investigation of the various phases of the building industries has just begun. In Chicago and

elsewhere proceedings are still in the investigate stage. More sweeping indictments, such as struck the plumbing and heating business in Cleveland, are still in the making. However, the Department of Justice is willing to play ball with those who sincerely try to obey the law, and will sit down with any business, large or small, and explore the legality of any proposed action, and render an opinion. It will even help to secure a consent decree from a Court if the problem involves fiscal questions that should be clarified to enable proper financing.

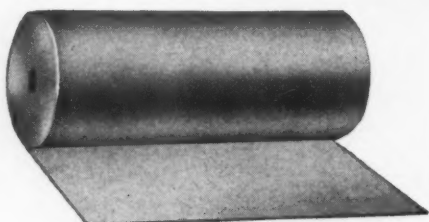
### U.S.H.A. Anticipations

The USHA reports it will use 200,000,000 square feet of roofing felts, 30,000,000 square feet of tile slate and shingles, 300,000 feet flue lining, 5,000,000 square feet building insulation and \$24,000,000 worth of air conditioning equipment and materials on its present program, and that the quantities will be doubled if its legislation before Congress is enacted.

The Department of Interior reports large sales of various kinds of heating equipment to Alaska, and large quantities of air-conditioning equipment and materials to Hawaii. Also bathtubs, to the latter.

## SAL-MO ASBESTOS PRODUCTS

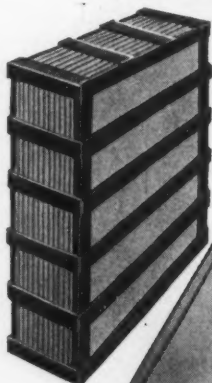
### for Warm Air Heating and Air Conditioning Insulation . . . . .



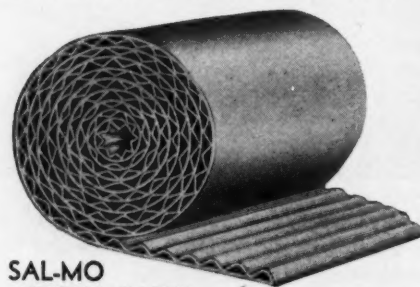
SAL-MO ASBESTOS PAPER



SAL-MO  
PIPE JOINT  
TAPE



SAL-MO  
ASBESTOS  
MILLBOARD



SAL-MO  
AIRCCELL PAPER

Your jobber *knows* the quality of all SAL-MO Asbestos Products and can quickly furnish you with the proper materials for insulation of all types of Warm Air Heating and Air Conditioning Equipment.

Other well known SAL-MO products are, Furnace Cements, Flexible Asbestos Jackets for hot water tanks and Coverings for all kinds of Steam and Hot Water Pipes.

SEE YOUR NEAREST JOBBER FOR SAL-MO  
WARM AIR HEATING INSULATION

SALL MOUNTAIN COMPANY

176 WEST ADAMS STREET  
CHICAGO, ILLINOIS



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for  
Samuel R. Lewis'

### "AIR CONDITIONING FOR COMFORT"

Third Edition  
288 Pages—Illustrated  
\$2.50

Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

Featuring this third edition are several entirely new chapters on phases of the subject not previously treated, including noise control, air conditioning measurements, air conditioning standards, fire protection codes and operating suggestions. Brand new designing examples are also used, together with new forms for recording the design data, the proper filling-in of which is explained step-by-step.

#### OF VALUE BOTH AS A REFERENCE AND TEXT

Engineers in air conditioning will find the new "Air Conditioning for Comfort" invaluable as a reference book, while salesmen, students, and others may rely on it to give them a clear knowledge of fundamentals, and of the latest air conditioning methods and equipment.

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You can promise *more capacity for the size of ventilator used* and a lifetime of trouble-free operation. Superior features of Swartwout Rotary construction help you sell this ventilator that you enjoy installing: modern curved body; elliptical steel tube bracing; stainless steel ball bearings; efficient low-slung vane.

Get full details now so you won't miss the chance to offer Swartwout Rotary on a profitable estimate. Thousands installed by contractors on industrial and commercial buildings. It pays you to know about Swartwout Airjector and Swartwout-Dexter Heat Valve, too. Write today for catalogs.

**The Swartwout Company**  
18615 Euclid Avenue Cleveland, Ohio

# Swartwout

## VENTILATION SPECIALISTS

## Neubecker Pattern For Transition Elbow

(Continued from page 60)

the lower left are shown the true lengths of dotted lines shown in V in elevation, while above this diagram the true lengths of the joint lines  $7^\circ$  to  $10$  and  $7^\circ$  to  $4$  in elevation.

Note that in these two sets of true length diagrams the altitudes are all equal as can be verified by referring to the distance between similar numbered horizontal lines shown in the true half sections. For example: take the joint line  $5$  to  $6$  in elevation. This has been set off in the joint line true lengths diagram shown from  $5^\circ$  to  $6^\circ$  and the altitude  $6^\circ-6$  is made equal to the distance between horizontal lines drawn from  $6$  and  $5$  in the half true lengths indicated from  $s$  to  $t$ . In this manner the balance of the altitudes are obtained.

### Developing Heel and Throat Patterns

Before the triangulation patterns can be developed the patterns for the heel and throat must be laid out first. Take the girth or stretchout of the heel in elevation from  $1$  to  $4$  and set it off on the horizontal line  $1$  to  $4$  at the upper right as shown by similar numbers. From the divisions  $2^\circ-3^\circ$  and  $4^\circ$  draw the usual measuring lines as shown. Now measuring from the line  $1-13$  in the true half section take the distances to points  $2-3$  and  $4$  and set them off on corresponding measuring lines in the heel pattern, measuring in each instance from the line  $1-4^\circ$  and obtain the intersections

$2-3$  and  $4$ . Trace a line through points so obtained to complete the half net pattern.

In a similar manner lay out the pattern for the throat. Take the girth of the throat  $10$  to  $13$  in elevation and lay it off at the upper right on the line  $10^\circ-13$  as shown by similar numbers. Draw the usual measuring lines and place there—on the projections  $10^\circ-10$ ,  $11^\circ-11$ , and  $12^\circ-12$ , which are obtained by measuring from the line  $1-13$  in the half true sections, to points  $12$ ,  $11$  and  $10$ . Trace a line through points so obtained in the throat pattern to complete the half net pattern.

### Developing the Three Patterns U-V and W by Triangulation

Having found all the necessary true lengths, the triangulation patterns are now in order. For the pattern for the upper part of the elbow marked W in elevation proceed as follows: Take the distance  $1-7$  in the true half sections and set it off as shown by  $1-7$  in pattern for W. Using  $1-2$  in the half pattern for heel as radius and  $1$  in the pattern for W as center describe a short arc near  $2$  which intersect by an arc struck from  $7$  as center with a radius equal to the dotted true length  $7-2^\circ$  in the true length diagram W.

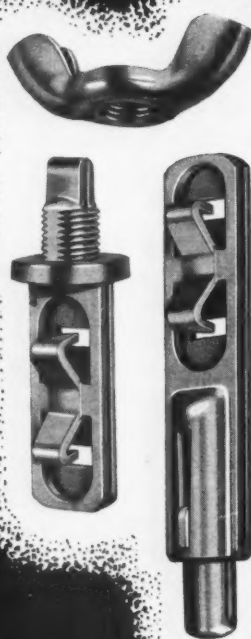
Now with  $7-6^\circ$  in the true length for joint lines as radius and  $7$  in the pattern W as center describe a short arc near  $6$  and intersect it by an arc struck from  $2$  as center with the solid true length  $2-6^\circ$  in the true length for W as radius.

Proceed in this manner using alternately first the proper numbered length of the slant line in the heel

## CONTRACTORS:

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The M. A. Gerett Co., makers of the Nationally Known E-Z-ON announces the new SNAP-TITE damper regulator.



New "Snap-Tite" damper regulator showing Snap End bearing.

JUST THINK . . . A new damper regulator that has all of the advantages of the E-Z-ON plus . . .

- SNAP END BEARING
- This new spring end bearing automatically snaps into correct position.
- Wedge Lock eliminates end play of bearing. This guarantees a permanent, rattle-proof job.



Cut-away of "Snap-Tite" Snap End bearing.

Snap-Tite is such a great improvement over the ordinary snap end regulator that we could go on and on telling you about it. But, we know a better way. See it for yourself at no cost per look.

CONTRACTORS: Just put your name and address on this ad. Send it to us and we will gladly send you your FREE SAMPLE of the new SNAP-TITE damper regulator. Do this today.

**M. A. Gerett Corp.**

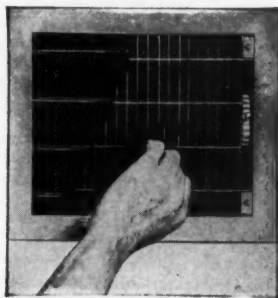
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MILWAUKEE, WISCONSIN

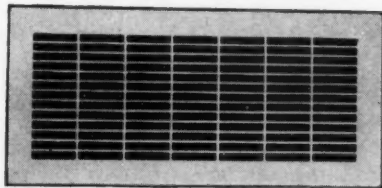
A 3054-1/2H



The "AIR-CON"—Air Control



Finger-Tip Air Control Register. Bottom Deflects Air Up or Down. No. 3320 Grille Gives Right or Left Deflection.



No. 20 Sidewall Stamped Grille—Large Open Area.



Ornamental Perforated Grilles.  
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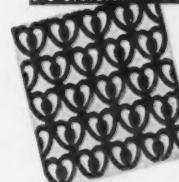
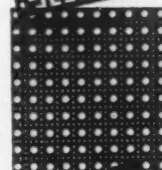
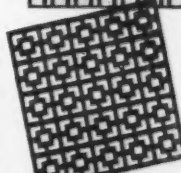
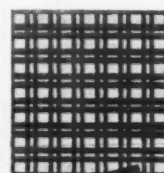
Registers, grilles or industrial screens from Standard Stamping & Perforating Company carry with them the guarantee of perfect performance and durability. Quality construction throughout assures dealers and manufacturers of installations and applications that will be modern and efficient to the minutest detail.

Architects, building contractors, air conditioning engineers and ornamental iron workers or fabricators will find our registers and grilles modernize old installations and are the last word in a modern, up-to-date job where appearance and performance are of prime importance.

Users of industrial screenings will find our line to be unusually varied and the fine assortment of faces and perforations will afford a grille or screen for every application.

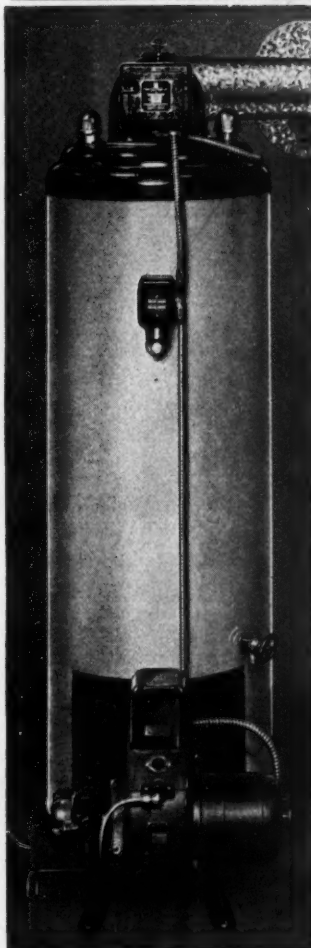
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*New Oil-Burning, Water Heating Units*

COMPACT • ECONOMICAL • BEAUTIFUL

Equipped with Johnson "BANKHEAT" Pressure Type burner, they are ideal equipment for home or apartment house.

DIMENSIONS: "83"—outside diameter, 20"; height, 63"; water content, 37 gallons; 85,000 b. t. u. output or recovery capacity of 100 gallons per hour at recovery capacity of 100 gallons per hour at 100 deg. temperature. "150"—for larger homes or apartments; water content, 45 gallons; 150,000 b. t. u. output. Write for folder. Burns No. 3 C. S. G. fuel or Diesel oil.

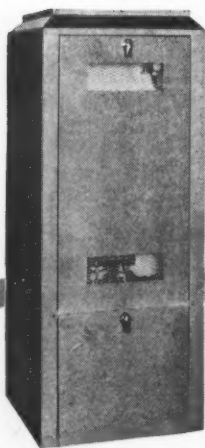
Oil Burners for every purpose, home or industrial; boiler-burner units and air-conditioning equipment.

*Worthwhile territories and franchises available to aggressive dealers anxious to serve their communities with a complete line. Write today, giving details on qualifications.*

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# 3 1940 DALZEN PROFIT OPPORTUNITIES

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## WINTER AIR CONDITIONER

*for use with Gas or Oil Burners*



This factory assembled 100,000 B.T.U. input Hi-Boy Unit (shown at left with front removed) is delivered as a complete packaged product. Available either with remarkably efficient Dalzen Gas Burner, continuous fire (power pot) Hi-Lo Oil Burner or Hi-Pressure gun type oil burner—it covers practically the entire range of your prospects. Write for details.

*Tropic Breeze*

## HEAT DISSEMINATOR

*for Small Homes, Stores, Offices, Rooms*

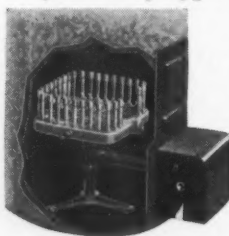


Occupying only 23" x 27 1/2" of floor space, developing full heat in from 1 to 1 1/2 minutes, this smartly designed gas-fired heater combines radiant with circulated heat for exceptional economy. Heats from 1 to 5 rooms, can be sold at surprisingly low cost with thermostatic controls. Investigate it for today's small home market.

*Multi-Tip*

## CONVERSION GAS BURNER

*for every type of Heating Plant*



Peak efficiency is assured in every case by using proper number of tips. It is installed quickly and economically in steam, hot air or hot water heating plants, with minimum of parts to wear or cause trouble. Thermostatic controls and Safety Thermopilot included. A real 1940 profit opportunity! Get the facts!

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DETROIT, MICH.

*\*Write for information regarding attractive terms and territories now available to dealers.*

lengths of *joint lines*, then the proper numbered true length of solid line in the true length diagram for W until the line 3-5 in pattern W has been drawn. Then using the length 3-4 in the heel pattern as radius and 3 in pattern W as center describe a short arc near 4, pattern, then the proper numbered true length of the dotted line in the true length diagram for W; the proper numbered true length in the diagram of true which intersect by an arc struck from 5 as center with 5-4 in the true length of *joint lines* as a radius. Now trace the curved line from 1 to 4 in pattern for W also from 4 to 7 to complete the net pattern shape.

In precisely the same manner develop the pattern for the center part of the elbow marked V in elevation which is shown by pattern for V. The distances from 4 to 7 and 7 to 10 are obtained from the diagram showing the true lengths of the *joint lines* or, the distance 4 to 7 could also be taken from 4 to 7 in pattern W, both being similar. The true lengths of the solid lines for pattern V are obtained from similar numbered lines in the middle section V in elevation which show their true lengths as previously explained and the dotted lines are taken from the diagram of true lengths in V.

When all these intersections are obtained curved lines are drawn from 4 to 7 to 10 to complete the net pattern shape.

The pattern for the lower part of the elbow U in elevation is shown in pattern for U and is laid out in a similar manner. 7-13 in pattern U is equal to 7-13 in the half true sections; 7 to 10 in pattern U is similar to 7 to 10 in pattern V or can be taken from similar numbered true lengths in the diagram showing true lengths of *joint lines*; 10 to 13 in pattern U is obtained from the proper numbered divisions along the slant line in the *throat pattern*. The true lengths of the dotted and solid lines in pattern U are obtained from similar numbered true lengths shown in the diagram of true lengths for U. Now trace the curved lines in pattern for U from 7 to 10 to 13 to complete the net pattern shape.

This elbow is a complicated problem in triangulation and should be carefully studied, using the dividers on the full size plate shown in Fig. P. No mistake can occur because all intersections in elevation; in the true half sections on joint lines; in the true lengths of all solid and dotted lines; in the true lengths of the joint lines diagram; in the half patterns for heel and throat and in the pattern shapes for U-V and W have similar numbers and letters.

If the elbow is to be riveted laps must be allowed on all pattern shapes. A-B-C-D in Fig. S shows a side view of the finished elbow with collars attached.

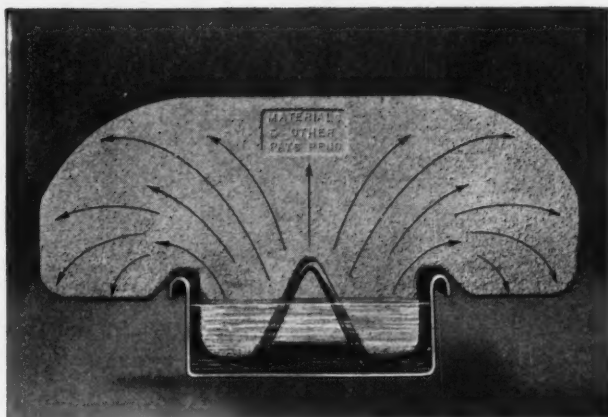
### J. R. DeWitt, Macon, Miss., Dies

J. R. DeWitt, 91, veteran tinner of Macon, Mississippi, burned to death in the Noxubee County Home recently when he became ignited while sitting in a chair before a fire. Native of Reading, Pa., he had resided here 30 years.

### Fox of Denver Moves

Fox & Co., Inc., are moving from 1326 Larimer to a new and larger shop at 1620 Blake Street, Denver, Colo.





## MONITE

(Pat. Pend.)

*The Original and Only Scientifically Engineered Vapor Diffusing Plates*

Not sawed sections of insulating brick, each plate is individually die-molded to correct conformation.

Laboratory-controlled material insures correct and uniform pore size, absorption and evaporation. Proven best even for lime-loaded water.

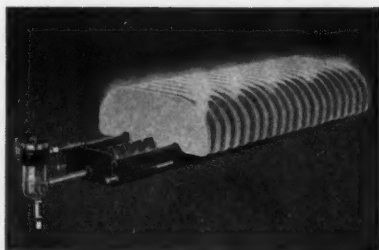
Each plate has a capacity equal to 50 sq. in. of water surface. Monmouth capacity chart enables proper number of plates for any installation to be determined at a glance.

NOTE: Do not judge the performance of these plates with that of inferior imitations. For complete information and prices write to:

### MONMOUTH PRODUCTS CO.

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Cleveland, Ohio



## MONMOUTH

*The Greatest Name in Humidification*



#### Are you in the stoker business for sentiment or profit?

More than 400 experienced stoker merchants decided to forget sentiment last year—and go after profits. They joined-up with Winkler and made more money.

Just ask any of them if they are happy. They'll tell you that they are not only happy but fortunate—because the national sales and profit average of Winkler merchants is three times greater than all others.

Winkler distributors make more money because—

#### A. THEY SELL MORE STOKERS

1. Because the Winkler line is the best and most salable—with exclusive features, easier to sell.

2. Because Winkler's assured sales program and merchandising assistance got the business—three times more than the average dealer got last year.

3. Because Winkler has the most complete line—binfeed and hopper models up to 800 pounds per hour, including three 30-pound per hour units to meet every price need.

#### B. THEY MAKE BIGGER PROFITS PER UNIT SALE

1. Because Winkler merchants buy direct-from-factory on a square deal franchise that eliminates an "override"—provides a bigger profit.

2. Because U. S. Machine Corporation's mass production facilities enable Winkler distributors to buy and sell the best stokers at low prices.

3. Because of exclusive features and completeness of line, Winkler distributors can "sell-up" so many prospects—turning small profit prospects into bigger and more worthwhile profits.

Write, phone or wire for information.



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## with DUX-SULATION

### AIR CONDITIONING DUCTS DON'T SWEAT WHEN COVERED WITH DUX-SULATION



Comes in a Roll, 100 square feet  
36" wide, complete with accessories  
for easy applying.

NO MORE DRIPPY DUCTS.  
SANITARY AND CLEAN FLOORS.  
NO MORE RUSTY DUCTS.  
PERMANENT INSULATION.  
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EASY TO APPLY.  
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ATTRACTIVE APPEARANCE.  
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GREATER OPERATING ECONOMY.  
NO PAINTING NECESSARY.  
QUIETS MECHANICAL NOISES.  
ASBESTOS PROTECTION.

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**GRANT WILSON, INC.**

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**PLANT RUBBER & ASBESTOS WORKS**

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SAN FRANCISCO

**AIR CONDITIONING UTILITIES CO.**

8 West 40th Street

NEW YORK

**ATLAS ASBESTOS CO., LTD.**

110 McGill St.

MONTREAL, CANADA

\$1,000 — \$1,300

**A. C. System**

(Continued from page 57)

The items for the accessories included in cost schedule No. 1 consist of the following:

Transformer .....	\$ 1.57
Solenoid .....	6.30
Thermostat .....	4.00
Thermostatic Expansion Valve.....	7.50

**\$19.37**

The items for the fittings included in cost schedule No. 1 consist of the following:

Heat exchanger—10' of 1½" at .22.....	\$ 2.20
Suction line—20' of ¾" at .175.....	3.50
Heat ex. tees 2, at .96.....	1.92
Liquid line—10' of ¾" at 4.7 cents.....	.47
Fittings—4 ells at .15 (¾").....	.60
Fittings—6 ells at .08 (¾").....	.48
Adapters 2, ¾" at .13.....	.26

**\$ 9.43**

The items for the accessories included in cost schedule No. 2 consist of the following:

Transformer .....	\$ 1.57
Solenoid .....	6.30
Thermostat .....	4.00
Thermostatic Expansion Valve.....	7.50

**\$19.37**

The items for the fittings included in cost schedule No. 2 consist of the following:

Heat exchanger—10' of 1½" at .22.....	\$ 2.20
Suction line—20' of ¾" at .175.....	3.50
Heat exchanger tees 2, at .96.....	1.92
Liquid line—10' of ¾" at 4.7 cents.....	.47
Fittings—4 ells at .15 (¾").....	.60
Fittings—6 ells at .08 (¾").....	.48
Adapters 2, ¾" at .13.....	.26

**\$ 9.43**

#### Overhead and Profit

They say "The proof of the pudding is in the eating." Well, the above schedules are the proof of the pudding. In the first place we have an actual installation in actual service for more than a year. In the second place, you have the actual costs as they would be for any contractor.

It should be pointed out, here, that overhead and profit have *not* been included in the schedules. These are *cost* schedules only and to the amounts shown each contractor must add his overhead and his profit. We have not attempted to include overhead because some contractors figure overhead on productive labor only; others figure overhead on labor and material. Depending on the owner's salary, rent, trucks, advertising, etc., overhead will vary widely.

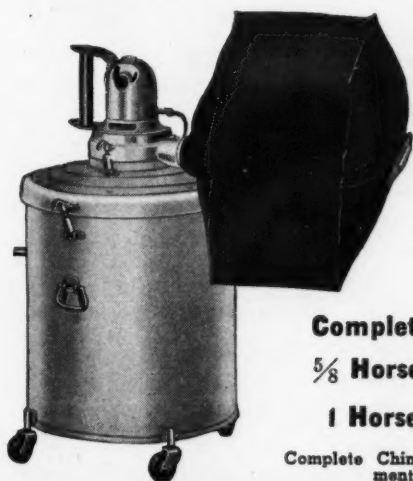
If the contractor figures overhead at 100 per cent of productive labor we should add \$90 to schedule 1, \$82.50 to schedule 2 and \$148 to schedule 3. To this sum, in turn, must be added



# GET SET for A CLEAN UP!

## Premier Furnace Cleaner

You'll be all lined up for plenty of extra profit from the day you get this handy, highly efficient Premier Furnace Cleaner. There's good



money in the cleaning itself—and you'll pick up many a lead on other profitable business as well! This light weight cleaner is easy to carry, can be operated by one man and is ruggedly constructed for long years of profitable service.

**Completely Equipped**

**5/8 Horsepower 69.50**

**1 Horsepower 89.50**

Complete Chimney Cleaning Equipment Only \$9.00

**ELECTRIC VACUUM CLEANER CO., INC.**  
1734 Ivanhoe Road Cleveland, Ohio

## You'll find Modern Design in NiAGARA Furnaces

**T**HE eye appeal makes a buy appeal in Niagara Winter Air Conditioning and gravity units. Gas Furnaces... Copper chrome cast iron; or... Toncan iron heat exchangers... selection of belt or direct drive blowers with two-speed control... summer-winter switch... modern casing design... concealed controls... high efficiency... low prices... A.G.A. approved... are features appreciated by home owner and builder alike.

Also coal and oil-fired furnaces.

**THE FOREST CITY FOUNDRIES CO.**

2500 W. 27TH ST.

CLEVELAND, OHIO

ESTABLISHED 1890

ATTRACTIVE TERRITORIES ARE OPEN FOR  
ESTABLISHED DEALERS • WRITE FOR DETAILS

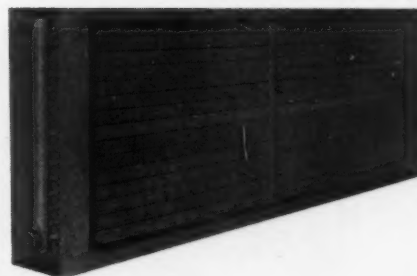
## G&O RADIATION FINNED COILS

FOR  
HEATING  
AND  
COOLING

AVAILABLE IN A  
WIDE RANGE OF SIZES

SEND  
FOR  
CATALOG

WATER  
COOLING  
COILS



**THE G&O MANUFACTURING COMPANY**

New Haven,

Connecticut

Pioneer Manufacturers of Square Finned Tubing  
in the United States

Tell  
them!  
Sell  
them!

### "MORE FOR YOUR MONEY"

Eight Important Advantages  
Distinguish Frederick Stokers

1. Healthful—it prevents the excessive temperature fluctuations so dangerous to winter health.
2. Inexpensive—in fact, it pays to own one, even heat.
3. Comfort—utmost comfort with clean, safe, even heat.
4. Saves—in time and labor—no more up and down the cellar stairs.
5. Dependable and quiet operation—fire will not go out in mild weather, yet it gives heat only when needed.
6. Automatic—heat as automatic as your light and water.
7. Underfeed firing—the most efficient method known to burn coal.
8. Application—can be applied to either hot air, hot water, steam or vapor boilers of almost any size.

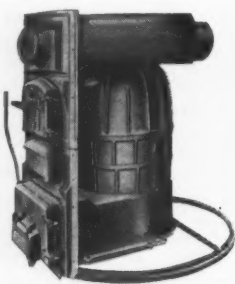


The **FREDERICK IRON & STEEL CO.**  
Anthracite and Bituminous Stokers  
EAST ST. FREDERICK, MD.



## ROUND OAK offers you...

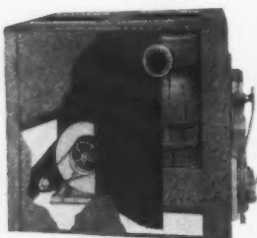
A COMPLETE QUALITY LINE  
LIBERAL MERCHANDISING HELP  
A FAMOUS 69-YEAR REPUTATION  
PRICES THAT RETURN YOU A PROFIT



**Moistair Blended-Iron**  
gravity furnace... a leader  
in your big volume market.  
Has many exclusive features.



**Boiler Plate Steel** gravity  
furnace of exceptionally fine  
construction. In sizes to  
meet all requirements.



**LX Coal Fired Air Conditioner**  
—a compact package unit for  
winter air conditioning. Com-  
plete with necessary equipment.



**XA-80 Oil Furnace and air**  
conditioner. Easy to sell  
because of amazing operat-  
ing economy. Priced right.



**Oil Burner** built exclusively  
by Round Oak. Combines  
principles of both gun and  
rotary type burners.



**Modern Coal Stoker**... a me-  
chanical masterpiece. Finest  
iron construction, efficient,  
dependable. Priced to sell!

**ROUND OUT**  
WITH  
**ROUND OAK**  
*of Dowagiac, Mich.*

THE COMPLETE LINE OF FURNACES  
OIL BURNERS AND STOKERS

the profit desired. It is felt, however, that the cost amounts shown will, with overhead and profit added, result in a selling price within our \$1,000 to \$1,300 bracket.

### Where Costs Are Held Down

How can it be done? Well, here are some of the answers.

In the first place, we don't need to calculate maximum sun loads on every exposure and "pyramid" them until the total is a whole lot greater than the actual load the equipment ever will be called upon to carry at one time, as a great many air-conditioning engineers do. Careful tests conducted by various authorities prove that the maximum cooling load on a residence never exceeds 75 percent of the load calculated in the usual manner. The reason is that the sun only shines on one exposure at a time, and the sun is always moving. Since several hours are required for any periodic heat load such as sun effect to penetrate heavy construction, only a part of the sun's energy striking a given exposure ever gets through because a large proportion of the heat turns around and goes back out to the outside air as soon as the sun moves around a little. If the sun stood still (as it is reputed to have done in one instance during Joshua's time), the full calculated load might eventually arrive inside the building. However, the day of miracles is past, and the sun keeps moving, whether we do or not.

In the second place, if we have winter air conditioning we don't need to buy a lot of expensive, ready-made equipment. All we have to do is to hang a direct-expansion coil in the outlet air duct from the furnace, and connect it up to a compressor. By placing the air cooling coil in the outlet from the furnace, we do not have to insulate the furnace and the casing to keep them from rusting out in the summer and we cut down losses of refrigerating effect to an unappreciative basement. Because we allow the fan to operate all the time at full winter air delivery and bypass the extra air quantity around the cooling coil, the temperature of the supply ducts is kept above the usual dew-point temperature in the basement so that it is not necessary to insulate the ducts to prevent condensation from forming on them. Yet we haven't sacrificed a thing in the way of comfort or of necessary automatic features.

Even engineering costs can be almost eliminated, because we know that the cooling capacity required for an insulated, six-room home will not be over one ton, nor the heating capacity over 75,000 Btu's per hour (at the bonnet), while the insulated seven-room home will not require more than 1½ tons cooling capacity, nor more than 100,000 Btu's per hour heating capacity. Any



## THERMO-DRIP *Automatic* HUMIDIFIER



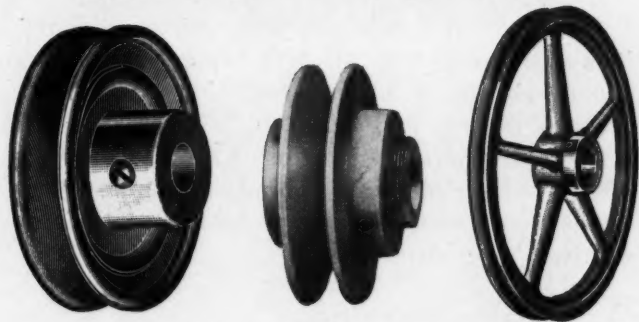
*Evaporates No More or Less Water  
Than Heat-Regulated Valve Feeds*

The heat-controlled water feed of the THERMO-DRIP keeps the moisture in the home precisely balanced with temperatures. Evaporation is stepped up as rising temperature speeds up the rate of drip . . . held in check as lower temperature throttles the feed. Your customers want this kind of performance when they buy humidifiers.

*Write for Details or Ask Your Jobber*

**AUTOMATIC HUMIDIFIER CO.**  
18th and Main Streets CEDAR FALLS, IOWA

## Compare MAUREY V-PULLEYS With Any V-Pulleys Made



Then you will know why so many builders of Air Conditioning and Refrigeration Units, Blowers, Fans and Stokers find that MAUREY V-PULLEYS save them time and money.

MAUREY STEEL V-PULLEYS are designed and built to give maximum service. Made of heavy steel sections with hubs of machined steel . . . not die cast.

MAUREY VARIABLE PITCH PULLEYS of cast iron construction. Speed adjustment of as much as 30%. Fine, accurate, milled threads, 20 to the inch, assure close adjustment. Made in 4 sizes—3¼ to 4½ inches. O. D. for Air Conditioning Units.

MAUREY CAST IRON PULLEYS are made on a new principle of design that permits freer flow of air through spokes. They are balanced and true running and much sturdier than pulleys of the usual design.

WRITE FOR CIRCULARS AND PRICES

**MAUREY MANUFACTURING CORP.**  
Wabash at 29th, Chicago, Illinois

## SOUTH BREEZE BLOWERS

*Stronger Construction and rust proofed  
for longer years of service.*

*No Vibration. Every rotating part balanced and adjusted by Electrocon Dynamic Balancer.*

*Sixteen Years of knowing how. Write for catalog giving dimensional and performance data.*

*Complete Line of blowers, parts, ventilating and evaporative cooling equipment. Compare our prices.*

## SOUTHERN FAN & BLOWER CO.

1311 So. Lamar Street, Dallas, Texas

## Great National's GOLDEN EAGLE The Evaporative Cooler That's Backed by 16 Years' Experience

- Installed in business places it **DOUBLES** summer business.
- Low cost—economical to operate—**RUST-PROOFED** and built for years of trouble-free service.
- Endorsed by hundreds of users.
- A big-profit **REPEATER** line, in all sizes for homes, stores, buildings.

*Mail the coupon today.*

**GREAT NATIONAL  
AIR CONDITIONING CORP.**  
Dallas, Texas

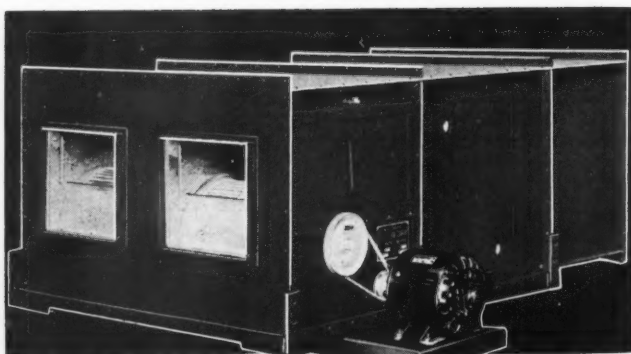
Great National Air Conditioning Corp.  
1307 So. Lamar St., Dallas, Tex.

Send particulars to

Name .....

Address .....

City-State .....



# CLORAGE

Designed to control temperature and humidity within close limits. Can be made completely automatic in operation, regulated by room thermostat and humidistat.

## Multitherm Units

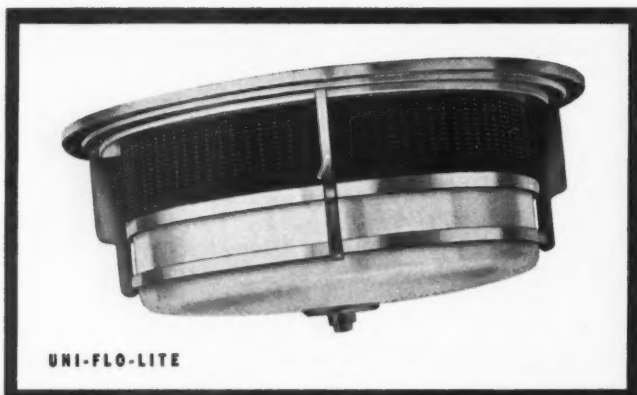
- ✓ Cooling
- ✓ Heating
- ✓ Complete Conditioning

Finest type of equipment available for small summer cooling, winter heating or complete year-round air-conditioning jobs. Widely used in factories, offices, stores, etc. Highly efficient; remarkably compact; easily installed in any idle space.

Write for Bulletin 107 describing various arrangements and giving capacity ratings.



**CLORAGE FAN COMPANY**  
872 PORTER STREET • KALAMAZOO, MICH.  
Sales Engineering Offices in all Principal Cities



UNI-FLO-LITE

### uni-flo

### GRILLES and REGISTERS

Upjohn Company, Kalamazoo, Mich. Architects and Engineers; Albert Kahn, Inc., Detroit, Mich. Sheet Metal Contractor; The J. A. Temple Co., Kalamazoo, Mich.

This exceptionally good-looking unit supplies both light and ventilation from a single ceiling unit. Please write for the new UNI-FLO Catalog.



**BARBER-COLMAN COMPANY**  
ROCKFORD • ILLINOIS

slight variations in cooling or heating capacity to obtain more exact balance may readily be made on the job by changing burner nozzles, and motor pulleys. Furthermore, the air distribution system may be economically designed by basing it upon some constant friction drop such as 0.08 inches per hundred feet of run from readily available tables.

You may have noticed that all of the cost figures have been based on insulated homes. How about the uninsulated-home owner? Sell him insulation. Health and comfort are impossible, either summer or winter, in any uninsulated home, regardless of the equipment used and insulation will pay for itself in two or three seasons on savings in heating costs alone.

## 6 Attic Fans in 1936— 75 Fans in 1939

(Continued from page 52)

closed the building remains cool through the hottest hours of the day.

Due to the many possible types of installation, the Peerless company, distributors in three counties, finds it necessary to train sub-dealers and agents. This involves personal advice, manuals of the manufacturer and like helps. This dealer likewise has set up window displays in several neighboring towns where there are sub-dealers, the arrangement being, in general, much like that here noted.

Peerless experts make calls with agents and furnish all engineering help during training. By this merchandising arrangement the normal selling staff of the larger company is increased and it is anticipated that this will bring about correspondingly increased business volume. This applies not alone to attic fans, but to general air conditioning, general ventilation, warm air heating and "winter" air conditioning, to oil and gas-burner sales which long have been a part of the company's activities.

## Automatic Services 700 Plants Yearly

(Continued from page 83)

larly is practiced is called for. One such case was that of an elderly physician who has a mechanic of the Automatic Heat Corp. fill his stoker hopper daily and remove ashes when necessary. This service, combined with inspection, cleaning and repair service, is enjoyed by the customer at a cost of \$100 per annum.

Automatic also believes that gas and oil-fired equipment, special boilers, should be vacuum cleaned three times yearly instead of twice, as called for on the annual agreement. This is due to the sooty nature of spent gas and the small gas passages of many makes of heaters.



# They'll buy CONCO



IN 1940... FROM YOU?

Literally thousands of "The Joneses" in homes from coast to coast have "pre-purchased" a Conco Oil-Fired Airconditioner for 1940 installation. They've heard of Conco's purified "Packaged Sunshine," of its economical, completely automatic operation from friends who said, "Get a Conco — ours is wonderful." Will you take their orders? With Conco heating and conditioning equipment sales up 80% in 1939, dealers are looking toward even greater sales — greater profits in 1940. The Conco line is complete. Write or wire today for the facts on Conco.



**PROFITS**  
in  
CONCO AUTOMATIC  
PACKAGED HEAT  
CONCO CORPORATION

**WRITE**

**CONCO CORPORATION**

*Automatic Packaged Heat*

DIVISION OF H.D. CONKEY & COMPANY

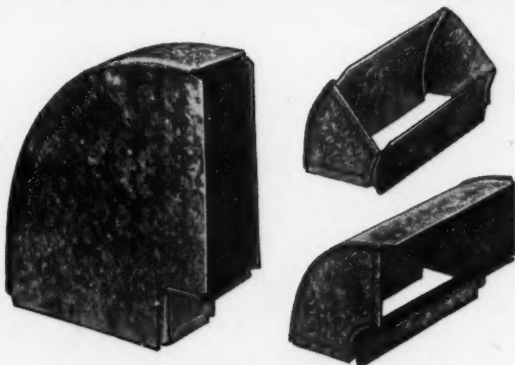
FOR FREE BOOKLET . 22 AUTO AVENUE, MENDOTA, ILL.



The complete Conco line — coal, oil and gas-fired — is packed with "sales-ability" and "profit-ability."

## AJAX

A NEW LINE OF  
**PREFABRICATED DUCTS and FITTINGS**  
for Forced Air and Air Conditioning Installations



Our Catalog "A" (Gravity Fittings), Catalog "B" (Forced Air Fittings) are yours on request.

**THE CINCINNATI  
SHEET METAL & ROOFING CO.**

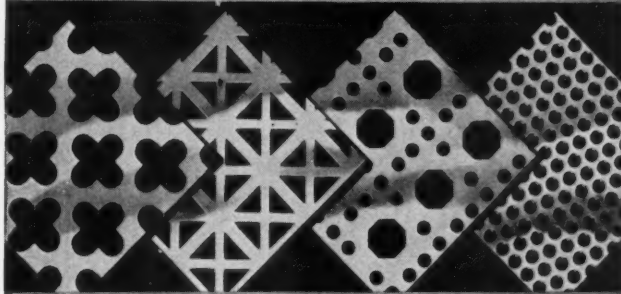
*Furnace Fitting Department*

230 E. Front St.

Cincinnati, Ohio

## PERFORATED METALS

Industrial and Ornamental



ANY METAL • ANY PERFORATION

Industrial Perforations include all sizes of round, oblong, and many special shaped perforations, for Screening, Grading, Draining and Guarding purposes. Our line is very complete.

Ornamental Perforations are used in Architectural Grilles, Radiator Enclosures, Metal Furniture, Cabinets, Stoves, etc. In addition to the standard shapes we have many exclusive and attractive designs suitable for different uses.

H&K workmanship is unsurpassed.

Write for prices and other information.

*The*  
**Harrington & King**  
PERFORATING CO.

5649 Fillmore St., Chicago, Ill.

New York Office, 114 Liberty St.

✓ *Accurate*  
✓ *Convenient*  
✓ *Complete*

... That's the story behind the success of AMERICAN ARTISAN'S Annual Directory, published each January. Its completeness, accuracy and convenience have made it indispensable to engineers and contractors throughout the year for reliable reference in their buying and specifying work. Further information gladly sent on request.

**KEENEY PUBLISHING COMPANY**

6 North Michigan Ave. Chicago, Ill.



# Janette

## Blower Wheels

**WHEELS for EVERY APPLICATION**

From 5"x1" to 12"x12"  
In Standard and Special Types

**TO MEET  
YOUR INDIVIDUAL REQUIREMENTS**



Janette wheels are built of soft steel. The method of construction is patented. They are sturdy, quiet in operation, efficient, light in weight and reasonable in price.

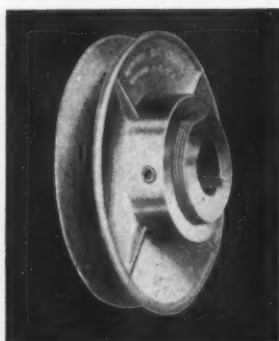
**ASK FOR DATA AND PRICES**

**SPEED REDUCERS - ROTARY CONVERTERS - MOTOR GENERATORS**

**Janette Manufacturing Company**

**556-558 West Monroe Street Chicago, Ill. U. S. A.**

BOSTON - NEW YORK - PHILADELPHIA - CLEVELAND - MILWAUKEE - LOS ANGELES  
DETROIT - SEATTLE

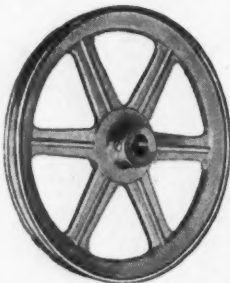


## PRECISION..

Precision is more often than not the difference between good, reliable products and cheap imitations. We stress the word here because precision comes first in the manufacture of Central Pulleys. We make certain before these Pulleys leave our plant, that

they will perform satisfactorily on stokers, blowers, etc

When you install Central products you automatically insure your jobs against breakdowns, and yourself against bothersome return calls due to pulley failure. Specify and install Central Pulleys wherever possible. Write NOW for further information.



2935 WEST 47TH STREET *Chicago, Illinois*

## With the Manufacturers . . .

### Harms Celebrates 80th Birthday

George Harms of Meyer Furnace Co., Peoria, Illinois, has recently celebrated his 80th birthday.

### Root with Superior

Ed Root, active in dealer educational work with Michigan dealer associations in the past several years, is now associated with the Superior Safety Furnace Pipe Co., Detroit, as their heating engineer.



### Carr Joins Maid-O'-Mist

H. J. Carr, formerly advertising representative with Domestic Engineering, has joined Maid-O'-Mist, Inc., Chicago. Mr. Carr will be in charge of sales with the title of vice president. He has also been elected a director of the company. Wm. J. Woolley is president, and O. V. Woolley is secretary and treasurer.

### Berge Recovering

Ed. Berge, central area representative for the Lau Blower Co., with headquarters in Milwaukee, is recovering from a serious operation.

### Harvey-Whipple Superintendent Dies

Frank A. Moran, for eight years factory superintendent for Harvey-Whipple, Inc., manufacturers of Master Kraft oil heating and air conditioning equipment, passed on after a short illness on April 10th.

Mr. Moran was an instructor in the Harvey-Whipple factory school conducted for dealers at the factory.

### Mayn Air Damper

Controlair, Incorporated, Elyria, Ohio, was recently organized under the laws of the State of Ohio, for the purpose of manufacturing and selling air conditioning equipment. Their specialty will be the manufacture of a new type of air balancing device, the Mayn Air Damper.

Officers are J. Earle Maynard, president; Charles L. Whidden, vice president in charge of production; and Paul O. Collins, secretary and treasurer. Mr. Collins assumes charge of the business management and sales.

### McLouth Purchases Dail Heating Division

B. F. McLouth, former engineer of Dail Steel Products Co., has purchased the heating division of Dail Steel Products Co., Lansing, Michigan. The purchase covers all inventory, good will, patents, manufacturing rights and the use of the trade name of Dailaire.

The purchasers are forming a new company to be known as the McLouth Air Conditioning Corp., and the new company will continue the manufacture, sale and installation of Dail air systems and will complete all service contracts now in effect. They will operate from the present location until about June 1. The two companies are entirely independent financially and in their legal status.

McLouth Air Conditioning Corp., Lansing, Mich.  
Dail Steel Products Co., Lansing, Mich.



## SINCE 1901 JOHNSON GAS APPLIANCES Have Saved Money for Their Users

If you have problems relative to gas application in heat-treating or gas burner equipment, we welcome the opportunity to help you solve them. We make specific burners for every gas application.

### No. 101 Bench Furnace Offers 1800°F. Without a Blower



The most powerful, efficient and economical bench furnace for heating soldering coppers up to 12 lbs. per pair, heat-treating, tempering, annealing or case-hardening carbon steel tools or small metal parts. Equipped with 2 Johnson burners, shut-off valve and pilot light. Johnson patented curved-shaped hood forces return blast over parts being treated. Base and hood heavily lined with refractory. Baffle plate and work rest block included.

### Use Low-Cost Johnson Soldering Fluid

Can be used on all metals and their alloys except aluminum. Will not vaporize under high temperature, nor will it evaporate or deteriorate. Inexpensive because so little is sufficient for general work.

WRITE TODAY FOR NEW JOHNSON CATALOG

**JOHNSON GAS APPLIANCE CO.**  
Cedar Rapids IOWA

519 E Ave. N. W.

Established 1901

## Become the LEADING MERCHANT IN YOUR TERRITORY WITH

# Gar Wood

HOME COMFORT-PROVIDING EQUIPMENT

### SUSTAINED LEADERSHIP

Gar Wood automatic home heating and air conditioning furnace-burner units led the nation in percentage of total sales in 42 key markets for the last four consecutive years—according to statistics published by a national trade authority. Cash in on Gar Wood's sales popularity. Become a prosperous leader in your community. Write or wire for the Gar Wood franchise facts.



Tempered-Air Units



Conversion Oil Burners



Boiler-Burner Units

### PRODUCTS

Oil- or gas-fired automatic Tempered-Air Winter Air Conditioning and Heating Units—Split Systems—Boiler-Burner Units—Conversion Oil Burners for existing Boilers or Furnaces—Domestic and Commercial Water Heaters—Ventilators—Airdux System for air distribution and control. Ask or write for descriptive literature.

Sell **NATIONALLY ACCEPTED PRODUCTS**

**GAR WOOD INDUSTRIES, Inc.**

AIR CONDITIONING DIVISION • DETROIT, MICHIGAN  
CANADIAN DISTRIBUTORS: ENGINEERING INDUSTRIES, LTD. TORONTO, ONT.

# "BB"

The mark of quality  
on sheet metal and  
roofers' supplies

**BERGER BROTHERS CO.**  
229-237 ARCH STREET, PHILADELPHIA, PA.

EAVES TROUGH  
GUTTER HANGERS  
CONDUCTOR PIPE  
CONDUCTOR FASTENERS  
MITRES  
END PIECES AND CAPS  
CONDUCTOR HEADS  
ORNAMENTAL STRAPS  
VENTILATORS, ETC.

## WHITNEY LEVER PUNCHES

### No. 4B PUNCH



Length 8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅜" to ⅝" by 64ths.

### No. 6 PUNCH



Length—26½ inches. Capacity — ¼-inch hole through ⅝-inch iron; especially adapted for button punching or temp-let work. Punches and dies ¼" to ⅝" by 32nds.

### No. 91 PUNCH



**CAPACITY**  
¼-inch hole through ¼-inch iron; ⅜-inch hole through ⅝-inch iron; 2-inch hole through ½-inch iron. Depth throat, 5 inches. Weight, 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber.

### No. 1 PUNCH



Length—34 inches. Capacity — ¼-inch hole through ½-inch iron. Punches and dies in sizes from ¼" to ⅝" by 64ths.

### No. 2 PUNCH



Length—23 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes ⅝-inch to ½-inch by 64ths.

### CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

**W.A.  
W**

**WHITNEY MFG. CO.**  
636 RACE ST. ROCKFORD, ILL.

**YOU'LL MAKE MORE PROFITS WITH JANITROL**

With many new sales producing features, this 1940 popular priced Janitrol strikes a new high in gas-fired winter air conditioning... money-making features that are easy to sell. Also, having the popular size models come completely assembled relieves you of much of the work and worry of installation and testing. Remember, too, that Janitrol is a product of the world's oldest and largest manufacturer of gas-fired equipment... an assurance to you of not only a good product but fair and generous treatment in factory-dealer relationship, both factors making for greatly increased profits. Write for "Dealer Information." Surface Combustion Corporation, Toledo, Ohio.

**THE NEW MULTI-THERMEX HEAT EXCHANGER**

**THE NEW PATENTED "AMPLIFIRE" BURNER**

**COMPACT—TAKES NO MORE ROOM THAN THE SHOVEL, CAN AND BROOM**

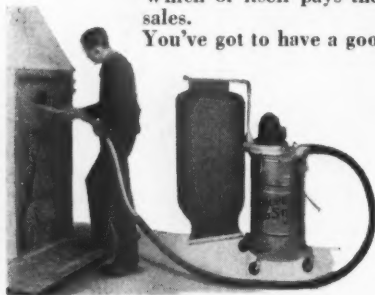
**POPULAR MODELS COME FACTORY ASSEMBLED!**

**WINTER AIR CONDITIONERS  
CONVERSION BURNERS  
UNIT HEATERS**

**JANITROL**

## If You Don't Do It Your Enemies Will

How do the most successful coal men sell coal today? By doing the home owner a furnace cleaning job.  
How do the most successful dealers sell gas or oil burners? Same as coal men, by cleaning furnaces to locate prospects.  
How do your own most successful heating plant men sell repairs, new grates, re-sets, smoke pipes, new heating plants? By the easy and steady soliciting of furnace cleaning jobs at every home.  
Which of itself pays them good profits, plus other sales.



You've got to have a good furnace cleaner machine, and an easy working plan, time tried and fire tested (not joking) by your own people. They must sell cleanings to succeed in your business today.  
Which sales plan to use? Which cleaner to buy? A quick way to get the right answers is to

### USE THIS COUPON

The National Super Service Company  
1944 N. 13th Street, Toledo, Ohio

Send me the Plan Book and complete information about your free trial and the new low-priced Super. Can I also clean tubular boilers?

Name .....

Street Address .....

City and State.....

## With the Manufacturers . . .

### Grant Totten Entertains Dealers

Grant Totten, Inc., 1215 McKinley Ave., S. W., Canton, Ohio, sponsored a second annual party for heating and sheet metal dealers in the Canton, Massillon and Stark County areas recently—an old-style chicken dinner at Silver Maples Tavern, just outside of Canton—a stag with about 75 present. After dinner, the company was entertained by:

George Boeddener, Assistant to the President, National Warm Air Heating & Air Conditioning Association, concerning dealer membership

Prof. S. Konzo, University of Illinois

"Bill" Nessell, Minneapolis-Honeywell, on dealer-manufacturer-jobber responsibility in the heating business

H. F. Curtis, Henry Furnace & Foundry Co., on "How to Stay Out of Trouble."

Open discussion followed each address. Short talks were also made by Frank Hess and H. S. Sharp. "Bill" Wise, past president NWAH & ACA, was in attendance.

### District Sales Managers Meet

U. S. Machine Corporation, Lebanon, Indiana, entertained approximately seventy men, forty of whom are district sales managers for Winkler stokers and thirty



large distributors, at the factory on April 3, 4 and 5. New models and new sales materials for 1940 were announced. The meeting included sales training in the various phases of stoker merchandising.

### Industrial Progress Program

The awards of the Industrial Progress Program, sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland, are for reports describing advances and improvements made between now and June 1, 1940, by application of arc welding to industrial work, including design, manufacture, fabrication, construction, welding service and maintenance. The product or structure may have arc welding actually applied to it within the period or it may simply be designed, or re-designed, within the period to utilize arc welding. In either case, the report is to include a design and description bringing out advances and improvements.

An analysis of the awards is available.

### George F. Sax Dies

George F. Sax, Sales Representative in the Syracuse district for The J. M. & L. A. Osborn Company, Buffalo, New York, died April 1, 1940, after a short illness. Mr. Sax was born in Syracuse, New York, and has been connected with the sheet metal industry throughout his business career.

### Central Supply, Minneapolis

B. J. Fery, well known in the Minneapolis area for the past 45 years is president of a new firm known as the Central Supply Company, located at 2929 Fourth Avenue South with 15,000 sq. ft. of floor space to handle furnaces and kindred lines. This supply house will serve Minnesota, Western Wisconsin and North and South Dakota.



## "Thanks For The Fine Help You Gave Us"

"The Williamson Heater Company:

We thank you for the fine help your company has given our salesman this past week by sending your representative here to spend his time calling on our trade.

Three of our men kept him busy every moment he was in the city. They made many important contacts which at present cannot be measured in dollars and cents, but we feel sure this fall we will get some business as a result of these calls."

Signed—X Y Z, . . . . Missouri.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

**FREE:** Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

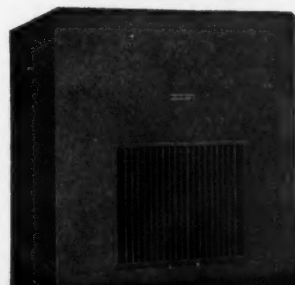
# WILLIAMSON

WARM AIR FURNACES

1890 — Golden Anniversary — 1940

## FOR SUMMER PROFITS

### Sell Comfort Cooling



EVAPORATIVE COOLING,  
LOWEST IN ALL COSTS, IS  
SWEEPING THE COUNTRY

Kooler-aire  
PACKAGE UNITS

CAPACITIES 2500 to 10,000  
C.F.M.

COOL, CLEAN, WASH,  
FILTER AIR IN-STORES,  
TAVERNS, SHOPS, BEAUTY PARLORS, OFFICES, HOMES

You can make money bringing Kooler-aire comfort cooling to the average business and home. Kooler-aire is low cost cooling. Easy to install, inexpensive to operate. Delivers big value. Write for complete details. USAIRCO shows you how to

sell and install comfort cooling. Complete merchandising helps.



Write for special data on wheels, housings and light duty assemblies.

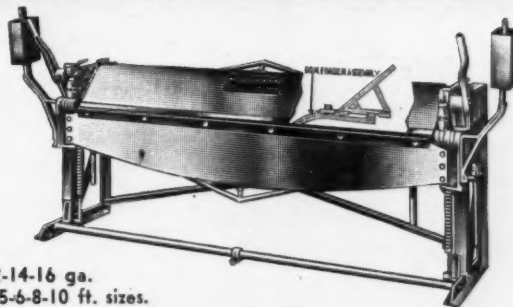


UNITED STATES AIR CONDITIONING CORP.  
NORTHWEST TERMINAL  
MINNEAPOLIS, MINNESOTA, U. S. A.

BENDING  
BRAKES

# WHITNEY-JENSEN

METAL  
TOOLS



12-14-16 ga.  
4-5-6-8-10 ft. sizes.

## THE BENDING BRAKES YOU NEED TODAY

LIGHT • ACCURATE • POWERFUL

Rigidity, strength, and lasting accuracy are assured by box-section, all-welded, steel construction. Extra-easy operation, provided by roller bearings on the apron and toggles, gives greater production with less effort. And—these COMBINATION brakes are quickly and easily convertible to box and pan bending whenever desired.

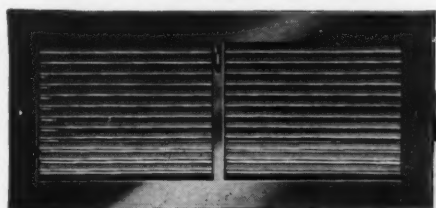
Please write for Catalog No. 13.

WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois

## NEW

### AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register—Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment. New Catalogue and Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.

Rock Island, Ill.

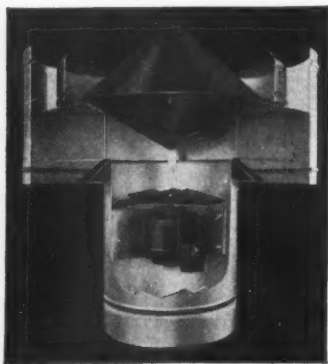
Mail me a copy of your new catalogue and dealer's net estimating book.

Name .....

Street Address .....

City & State .....

## New Fan Ventilators!



### ALCO

The Allen Corporation announces the new ALCO high-capacity combination exhaust fan and roof ventilator. Combines highly efficient stationary ventilator with powerful silent exhaust fan located in the throat. Primary suction band of large diameter provides free area outlet of great proportion, in relation to stack size.

### Send For Catalog File Sheet

giving complete specifications and illustrations. This new type ventilator is of great importance for industrial installations, due to extremely large area of free air outlet in combination with interior deflecting cone, operating with maximum efficiency and reducing static pressure to a minimum.

Other NEW Allen products: "Standard" Fan Ventilators; Turbine Fan Ventilators; Auxiliary Fan Sections; Isolated Motor-Fan Ventilators; Allen Remote Drive Fan Sections.

Send for Literature for your Files.

**The ALLEN Corporation**  
9752 Erwin Ave., Detroit, Michigan, U. S. A.

## Controls Must be Dependable

If the controls of a heating plant or air conditioning system are not dependable; if excessive temperatures will change their set, then customer complaints are sure to follow—you get blamed and your reputation suffers. Service calls from dissatisfied heating plant customers soon eat away your profits.

Avoid unnecessary service costs, make a more careful study of the controls that are to regulate the actions of the heating plant and air conditioning systems you install. Remember that the difference in first cost between a dependable control and one that may slip or lose its set is but a trifle, often the price is the same. Don't take chances, the best will save you money in the long run.

Chace High Temperature Thermostatic Bimetals, which are now used as the actuating element in so many of the leading controls, offer dependable, uniform action. Chace bimetal is engineered to operate under the most severe conditions. For that unfailing action and consistent operation, year after year, make sure that the controls you install are actuated by Chace High Temperature Bimetal.

*Control manufacturers are invited to consult us regarding the type of Chace Thermostatic Bimetal best suited to meet specific demands.*

**W. M. CHACE COMPANY**  
1601 Beard Ave. Detroit, Mich.

## New Literature

For your convenience in obtaining copies of new Literature, use the coupon on page 114.

### 144—Dampers, Regulators and Accessories

Young Regulator Company, 4500 Euclid Ave., Cleveland, is distributing catalog No. 1—dampers, damper regulators, remote control regulators and accessories. Price list is included.

### 145—Eskimo for Cool Comfort

Star Radiator Company, 920 South Alameda Street, Los Angeles, is distributing a 4-page folder entitled "Eskimo for Cool Comfort," covering DeLuxe Eskimo Koolers and Koolet Room Koolers.

### 146—The Finish on Your Product

Ferro Enamel Corporation, Cleveland, is distributing a booklet entitled "The Finish on Your Product," discussing eye appeal, function, types of finishes available, porcelain enamel, and includes a chart comparing various major finishes available.

### 147—Nozzle and Nozzle Accessories

Spraying Systems Co., 4021F W. Lake St., Chicago, is distributing a new catalog (No. 20) entitled "Nozzles and Nozzle Accessories for Every Purpose"—air washers, air coolers, humidifiers and dehumidifiers, dust prevention, roof cooling, metal cleaning, water cooling, etc.

### 148—Hartzell Issues Twelfth Catalog

Hartzell Propeller Fan Co., of Piqua, Ohio, has just issued catalog No. 12, of 32 pages and cover.

The new catalog illustrates and describes the entire line of Hartzell propeller-type fans and blowers, and gives air-delivery table on each.

New sizes and models are contained in the new catalog.

### 149—Cop-R-Loy

Wheeling Corrugating Company, 2547 Arthington St., Chicago, is distributing a 12-page booklet covering Cop-R-Loy, a steel sheet having a copper addition. Subjects covered are corrosion resistance, finishes, formula, formed sheet products, how to specify, installations, roofing ternes, sizes terne plates, and tests for rust resistance.

### 150—Portable Electric Tools

Skilsaw, Inc., 5033 Elston Avenue, Chicago, is distributing Catalog No. 41 describing and illustrating the complete line of Skilsaw tools. Separate price list accompanying gives consumer prices on all tools and their accessories.

Practical uses of Skilsaw tools and manufacturing practices behind the tools are presented in the editorial pages.

### 151—Zephair Gas Furnace

XXth Century Heating and Ventilating Company, Akron, Ohio, is distributing a 4-page folder covering the new all-cast Zephair automatic gas furnace. Double gear-shaped radiators with baffles are a feature. The radiators, blower, filters and burner are all described and illustrated. Capacities listed on a specification sheet included range from 60,000 to 240,000 Btu output per hour.

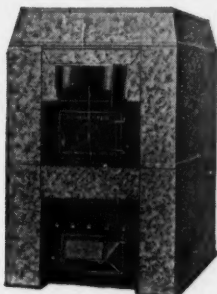
### 152—Tin and Its Uses—No. 4

International Tin Research and Development Council, Battelle Memorial Institute, 505 King Ave., Columbus, Ohio, is distributing the fourth issue of "Tin and Its Uses," which announces a new "white-bronze" plating which resists tarnish and is almost identical in color and reflecting power to perfectly polished silver.

As a result of recent improvements in electroplating technique, thick and adherent tin linings can now be applied to large pieces of apparatus used in the food industry.



## QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS



### INCREASED SALES and PROFITS

Are assured if you sell Hess equipment. Why sell ordinary furnaces as sold by mail order concerns and other competitors when Hess offers superior value and performance at low prices.

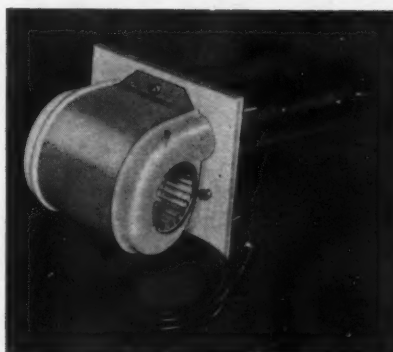
### THE HESS LINE IS COMPLETE

It's Different and Better.

The Hess furnace is rectangular throughout with heavy welded steel innerbody. Hess blower-filter units, oil burners, stokers and accessories, fill every dealer requirement. Exclusive territory protection. Free plan service. FHA terms. Free consumer literature gives every advantage to a Hess dealer.

**WRITE FOR DEALER PORTFOLIO**  
**HESS WARMING & VENTILATING CO.**  
1211-27 S. WESTERN AVE. Founded 1873  
CHICAGO, ILLINOIS

## LIST PRICE



**\$15**  
(COMPLETE)

### AT LAST! A VENTILATOR THAT SMALL HOME OWNERS CAN AFFORD TO BUY

\$15 is the price complete—there is nothing more to buy. Each Skuttle Junior Ventilator comes already mounted on enameled panel with toggle bolts for easy installation on the wall. Also furnished with 8 ft. of electric cord, plug and switch. Ideal for use in auto trailers, recreation rooms, lunch rooms and dark rooms.

Write today for attractive dealer discounts on this fast selling item.

**J. L. SKUTTLE COMPANY**  
DEPT. E  
1015 FRANKLIN STREET DETROIT, MICH.



Be sure to see historic Philadelphia—stay at the Bellevue—one of the few world famous hotels in America. The Bellevue IS Philadelphia.

*Reasonable Rates*

**BELLEVUE**

**STRATFORD**  
IN PHILADELPHIA

CLAUDE H. BENNETT, General Manager

## MARSHALLTOWN THROATLESS SHEARS!

### ★ THE MOST PROFITABLE TOOL IN THE SHOP!

No matter what type of cutting — either irregular shapes or straight splitting—from ANY size sheet, you'll quickly find that the Marshalltown Throatless Shear is the most profitable tool in the shop. Does hundreds of odd shearing jobs — faster and better — and it's an inexpensive hand operated tool. Quickly cuts ANY shape in 18 gauge or lighter material.

Send at once for Shear Bulletin. It gives all details of the Marshalltown line of sizes from 18 gauge to 1/2 inch capacity.



No. 18  
Hand  
Power

**MARSHALLTOWN MFG. COMPANY**  
920 E. Nevada Street Marshalltown, Iowa



**WEIL  
ELECTROPUMP**

## WEIL ELECTROPUMP

**T**HE Weil Type "R" Electropump is an all ball-bearing motor-mounted pump ideal for water circulating, spray and cooling tower service. Sturdily constructed it will operate with exceptional efficiency and an absolute minimum of noise and vibration on the most exacting jobs.

Dealers and contractors will find the Electropump an excellent item to add to their lines for profitable sales and highly efficient trouble-free service on installations.

Literature describing the unit more fully will be sent on request.

### WEIL PUMP COMPANY

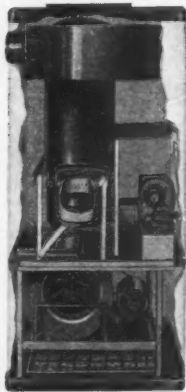
BILGE-SEWAGE  
FIRE-HOUSE  
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BOILER FEED  
CONDENSATION  
VACUUM

Wells and Superior Streets—Chicago, Ill.

## VIKING OIL-BURNING FURNACES



Utility room model,  
built for real floor  
space economy.



**TO FIT THE  
Smaller  
Capacity  
FIELD**

### FOR TODAY'S BIG MARKET!

A survey of new homes reveals that 85% require less than 100,000 B.T.U.'s of heat on coldest days.

Viking gives you your big opportunity in this tremendous market. An entirely new type of heating plant—completely automatic, **LOW-PRICED** Winter Air-Conditioning Units for new homes and modernization.

Eight Viking models—rated 55,000 to 100,000 B.T.U.'s at the bonnet—to meet every requirement in the smaller capacity field. Efficient, compact units for either basement or utility room installation. Employ new multi-stage Breese vaporizing-type burners—matchless in performance and lowest-cost operation. Write for free illustrated Viking folder today!

VIKING MFG. CORPORATION, 12602 Greenfield Ave., Detroit, Mich.

## New Literature

For your convenience in obtaining copies of new Literature use the coupon on page 114.

### 153—Trane Climate Changers

The Trane Company, LaCrosse, Wisconsin, is distributing to architects, engineers and contractors Trane Data Bulletin D303-2 for easy selection of the proper Climate Changer unit for the job.

This 76-page data bulletin includes complete description, specifications, capacities and dimensions on Climate Changers, the Sprayed Coil Unit, as well as information on coil selection, water friction and water velocity.

### 154—Asbestos Insulates Duct

The Philip Carey Company, Lockland, Cincinnati, Ohio, is distributing a new catalog in four sections, covering Careyduct (an asbestos insulated duct) pipe covering for air conditioning, Carey "Firefoil" panels (an insulating material that comprises characteristics of structural materials), and Careycel asbestos metal duct insulation for air conditioning systems. 44 reasons are given for Careyduct which comprises both duct and insulation.

### 155—Sheet Metal Welding Fundamentals

The Linde Air Products Company, 20 E. 42nd St., New York City, is distributing a new booklet, "Sheet Metal Welding Fundamentals," including instruction outline for welding light-gauge sheet and tubing.

The booklet covers such subjects as design factors, the control of expansion and contraction, the use of jigs, the weldability of the material and the welding procedure. Also included is a supplementary outline for teaching the welding of sheet metal and tubing—an aid for instructors. The outline contains suggestions for lectures, demonstrations, shop work and study references for 30 lessons.

### 156—Auer Register Book 40 and 40A

The Auer Register Company, 3608 Payne Ave., Cleveland, has published a completely revised catalog of their line of registers and intakes for warm air and for air conditioning, known as Auer Register Book 40, with illustrations, sizes and prices of all models.

Catalog 40A is condensed, showing only those styles in registers and intakes which are most in demand for the average warm air or air conditioning job.

Auer stamped metal grilles (for concealment, ventilation, radiator enclosure) are now shown separately in Auer Catalog "G."

### 157—Arc Welding Handbook

The Lincoln Electric Company, 12818 Coit Road, Cleveland, is distributing the Sixth Edition of the Procedure Handbook of Arc Welding Design and Practice.

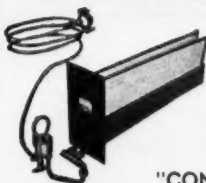
The eight sections of the book cover the following subjects:

- Part I—Welding Methods and Equipment (24 pages, 23 illustration)
- Part II—Technique of Welding (114 pages, 167 illustrations)
- Part III—Procedures, Speeds and Costs for Welding Mild Steel (118 pages, 143 illustrations)
- Part IV—Structure and Properties of Weld Metal (28 pages, 42 illustrations)
- Part V—Weldability of Metals (92 pages, 92 illustrations)
- Part VI—Designing for Arc Welding Steel Construction of Machinery (144 pages, 252 illustrations)
- Part VII—Designing for Arc Welded Structures (240 pages, 301 illustrations)
- Part VIII—Typical Applications for Arc Welding in Manufacturing, Construction and Maintenance (329 pages, 537 illustrations)

The Procedure Handbook is 5 1/2 x 9 inches, the binding is dark blue semi-flexible simulated leather, gold embossed. Postpaid, \$1.50 in the U. S., or \$2.00 outside U. S. A.



## Add HUMIDITY to Space Heaters and ADD PROFITS!



NOW, with this low cost humidifier, you can cash in on the Space Heater Market with EXTRA PROFITS!

"CONVECTOR" HUMIDIFIER is specially designed by Maid-O'-Mist, Inc. Low in Price. Rigidly constructed. Complete, and ready for easy installation. Adopted as STANDARD EQUIPMENT by many manufacturers after thorough tests of its efficient operation.

Send for Complete Specifications and Prices

### MAID-O'-MIST, Inc.

213 North Aberdeen

Chicago, Illinois

## ACME "Hot Spot" WELDERS

Universally accepted as the sturdiest, easiest handled, most economical electric Spot Welder on the market.

Write for literature and prices

**Don't Rivet  
SPOTWELD!  
with an ACME**

Lifetime Guarantee!

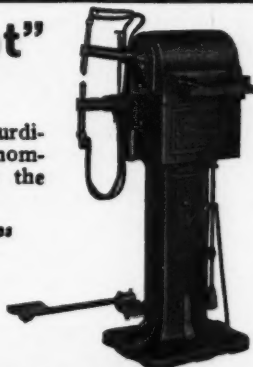
Complete range of sizes

**ACME ELECTRIC WELDER CO.**

Distributors in principal cities

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(Los Angeles County)



## THE "GOESE" ORIGINAL TIME SAVER DAMPER CONTROL

Patented

MADE FROM SOLID COLD ROLLED STEEL AND NOT TO BE CONFUSED WITH THE ORDINARY STAMPED STEEL TYPE.

Ask Your Jobber

**GOESE MFG. CO.**

2548 N. 18th Street

Milwaukee, Wisconsin



## PORTABLE SHEARS ALL-ALLOY



Two Sizes

ALL-ALLOY No. 2 cuts up to 1/4" steel plate.

ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.

Special blades may be had for shearing stainless steel.

**FULLY GUARANTEED**

**BREMIL MFG. CO. Erie, Pa.**

## SALES DEVELOP NATURALLY

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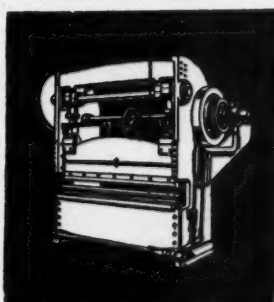
**GRAND RAPIDS  
FURNACE  
CLEANER**

Free Trial  
Convenient Terms

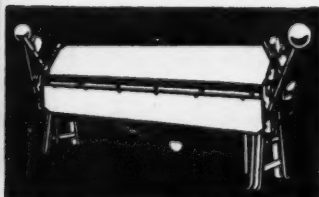


Write  
for  
details

**DOYLE VACUUM CLEANER CO.**  
227 STEVENS ST., S. W. GRAND RAPIDS, MICH.



PRESS BRAKE



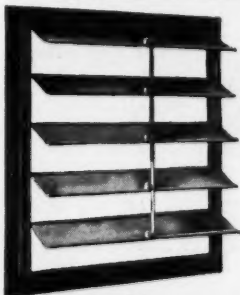
HAND BENDING BRAKE

Steel Brakes—Presses—Shears

**DREIS & KRUMP MFG. CO.**

7404 LOOMIS BLVD.

CHICAGO



ELGO TYPE

Get our prices on Automatic, Stationary and Hand Operated Shutters, also Ceiling, Balanced and Back Draft Dampers and Motorized Shutters.

**ELGO SHUTTER & MANUFACTURING CO.**  
634 W. Warren

*Elgo* Ventilating  
Specialties

**An Automatic Shutter  
That's Different**

In the first place, the Elgo Automatic Shutter fits more snugly. Secondly, the blades do not flutter—and there are no joints that get loose and rattle. And, third, it opens more easily. It is more sensitive to air currents than any other shutter. Sizes from 10" to 60" square—also rectangular.

Write for circular and prices!

**Free  
CATALOG**

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FOR ALL  
HEATING UNITS



**A. G. BRAUER SUPPLY CO.**

Distributors of All Heating and Air Conditioning Equipment

2100 Washington Ave. St. Louis, Mo.

**VIKING**  
**HUMIDIFIER VALVE**

The only valve with the accessible orifice.

Write today for new catalog and prices.



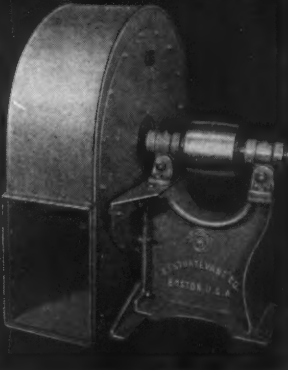
**VIKING**  
AIR CONDITIONING CORP.  
9500 Richmond Avenue, S. E., Cleveland, Ohio

**MILL EXHAUSTERS**

1. Designed and built by the **Pioneer** exhauster manufacturer.
2. Result of over 75 years of air engineering experience.
3. High efficiency assures low power consumption.
4. Sturdy construction assures dependable service.

Write for Catalog No. 430

**B. F. STURTEVANT CO.**  
Hyde Park, Boston, Mass.  
Branches in Principal Cities



*Just a minute!*  
**BEFORE YOU START ON that FURNACE JOB**

Better cement means a better job. Ironset Furnace Cement guarantees a gas-tight seal in setting up new furnaces and resetting old units. It ends customer complaints.

Ironset withstands higher temperatures than ordinary cements. It does not shrink, crack, bloat, or blister at highest operating rates. Can be fired immediately. Can even be applied to hot metal.

Stocked by leading jobbers everywhere, Ironset is sold in 1, 5, and 10-lb. cans, also in 50 and 100-lb. drums. Order from your jobber or write us for prices and free bulletin.

Fireline Stove & Furnace Lining Company  
1816 Kingsbury St. Chicago, Ill.

**IRONSET**  
FURNACE CEMENT



**TO GET THE BEST—SPECIFY CONGRESS DRIVES**



Their accuracy is factory tested. They are manufactured from the finest materials by the most efficient methods in America's finest, most modern die casting plant. Over 400 sizes carried in stock insure prompt deliveries. Samples to rated concerns for test purposes.

Write Today for Catalog 140

**CONGRESS DIE CASTING DIV.**  
Congress Tool & Die Co.  
3758 E. Outer Drive Detroit, Mich.

## New Literature . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

### 158—Attic Fan Specifications

T. L. Herbert & Sons, Nashville, Tenn., is distributing a folder containing their attic fan specifications.

### 159—Automatic Heating Accessories

Robert Barclay, Inc., 122 North Peoria St., Chicago, wholesale distributors of automatic heating accessories, is distributing Catalog No. 111—Spring-Summer, 1940.

### 160—Stakool Ventilation

Manker Products Company, Inc., Memphis, Tenn., is distributing a folder entitled "Enjoy Summer Comfort with Stakool Ventilation," with specifications and prices.

### 161—Air Conditioning Registers

The Independent Register Co., 3747 East 93rd St., Cleveland, is distributing Bulletin No. 403 covering the No. 139 Wall Register with flexible grille bars. Sizes, list prices and free areas with detail information are included.

### 162—Acoustiglu

Hetzel Roofing Products Co., Newark, N. J., is distributing an 8-page folder covering Hetzel's "Acoustiglu" electric acoustical and insulation cement for applying acoustic tile, soundproofing and insulation on ceilings, walls, refrigerators, kilns, dryers, oil and gas storage tanks, etc.

### 163—Guide to Nickel Alloys

The International Nickel Company, Inc., 67 Wall St., New York City, is distributing "7 Minutes with 7 Metals"—16 pages, pocket size, including material on Nickel, Monel, Inconel and associated alloys in both mill and clad forms. Space is also devoted to the properties and uses of the metals in cast form. Three pages are devoted to detailed tables on mechanical, chemical and physical characteristics.

### 164—April 20th Price List

Milcor Steel Company, Milwaukee, Wisconsin, has ready for distribution a new price schedule for the complete Milcor line of sheet metal building products and fireproof building materials—rain carrying equipment; roofing and siding; ventilators and skylights; farm specialties; metal ceilings, cornices and walls; furnace pipe, fittings and accessories; stove pipe, bake ovens and Airtite heaters; metal lath, metal trim and other fireproof building specialties—indexed and bound in pocket-size handbook.

#### FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

62	63	64	65	66	67	68
69	70	71	72	73	74	75
76	77	78	79	80	81	82
144	145	146	147	148	149	150
151	152	153	154	155	156	157
158	159	160	161	162	163	164

Name . . . . . Title . . . . .

Company . . . . .

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Are you Manufacturer—Jobber—Dealer—



Any range  
15 F.P.M. to  
24,000 F.P.M.

**TAKES JUST A MOMENT  
TO CHECK AIR VELOCITIES WITH THE**



## alnor ALL PURPOSE VELOMETER

You can save time and know whether your heating and air conditioning jobs are right when you use the "ALNOR" Velometer. Without timing or complicated mathematical calculations the Velometer gives direct, accurate, instantaneous air velocity readings. Many users report that with the Velometer they can check and balance a system in one tenth the time formerly required, and the Velometer gives them a picture of air distribution that no other instrument can. Write for details.

**ILLINOIS TESTING LABORATORIES, INC.**  
419 N. La Salle Street Chicago, Illinois

## WISS "METAL-MASTER" SNIPS (Compound Action)



"TWICE  
THE WORK  
WITH HALF  
THE  
EFFORT"

TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

**J. WISS & SONS CO.**  
ESTABLISHED 1848 NEWARK, N. J.

## FIRELINE Plastic Furnace Lining



### Repairs Cracked or Broken Firepots

Fireline forms a one-piece, fire brick lining one to 1 1/4 in. thick entirely around the firepot. Seals cracked and burned-out firepots gas-tight, and at the same time gives a modern, refractory lining that burns the fuel hotter and more completely. Protects and preserves new castings.

Installed in several hours through the fire door without dismantling the furnace. Owners who cannot afford new castings can afford Fireline, and Fireline allows you a substantial profit.

Sold in 50 and 100 lb. drums. Order from your jobber or write us for prices and free bulletin.

**FIRELINE STOVE & FURNACE LINING CO.**  
1816 KINGSBURY ST., CHICAGO, ILL.

## BUFFALO, N. Y.

**HOTEL LENOX** announces the completion of its 2-year rehabilitation program. *Everything is new*—decorations, furniture, tile baths, all with tub and shower, elevators, Bar Lounge—nothing overlooked.

SINGLE: \$2.00 to \$3.50 DOUBLE: \$3.50 to \$6.00  
Special Rates for Groups and Families

DELICIOUS MEALS — MODERATE PRICES

CLARENCE A. MINER, PRES.

**HOTEL LENOX**  
NORTH ST. NEAR DELAWARE  
BUFFALO, N.Y.

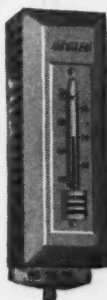
Official AAA Road Map and hotel folder with map of downtown Buffalo, free on request.

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## LARGE STOCKS... IMMEDIATE SHIPMENT

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structural, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

## NO FAILURES HERE!



Simplicity and ruggedness characterize the construction of the Master Heat Regulator. Operates on temperature differential of only 1 degree. Almost unbelievable are performance records reported by dealers everywhere. Unexcelled in its price class for dependability and accuracy. Manufactured by the WHITE MANUFACTURING CO., makers of scientific temperature controls for over 20 years. 2362 University Avenue, St. Paul, Minnesota.

## MASTER HEAT REGULATOR

## YOU CAN UNDER-SELL, AND MAKE— MORE PROFIT WITH THE PEERLESS LINE...



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## PARKER-KALON Jiffy REGULATOR SET

For controlling dampers in heating, ventilating, air conditioning systems.

SIMPLE... LOW COST

SAVES TIME

AND LABOR

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INSTALLED IN  
A JIFFY!

Slip on FRAME  
and LEVER

Turn WING NUT

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

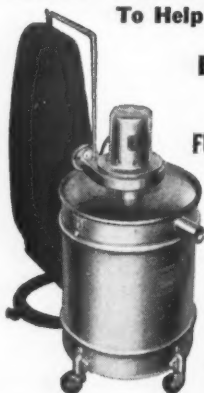
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NEW 1940 MODELS  
NEW LOW PRICES  
SAME HIGH QUALITY

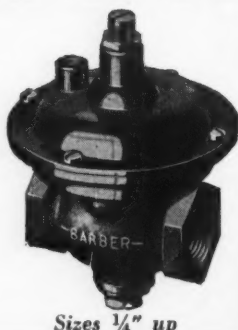
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55% of the jobs were sold repairs which in-  
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Write for Sales Plan and Free Trial Offer  
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Gas Pressure  
**REGULATORS**  
for Reliability!

Certified by A. G. A. Testing Lab-  
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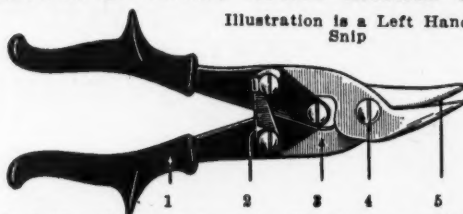
**THE BARBER GAS BURNER CO.**  
3702-4 Superior Avenue  
CLEVELAND . . . . . OHIO



Sizes 1/4" up

## KLENK'S Double Action Aviation Snips

Illustration is a Left Hand  
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1. Detachable rubber grips over handle of chrome molybde-  
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  2. Adjustable lock
  3. Special hardened alloy steel. Tensile strength 3500 lb.
  4. A. & H. Standard bolts
  5. Curved jaws for cutting ends of tubing to .065 in. wall
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for both right and left hand—straight or curves—Easy to  
work—Order today.**

**KARL KLENK'S AVIATION SNIPS**

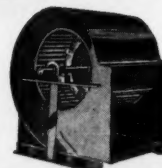
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WILMINGTON, DELAWARE

**QUICK SERVICE**  
on AIR CONDITIONING  
SUPPLIES and EQUIPMENT



Send for our big  
FREE catalog. Prompt  
service on mail orders  
. . . and from our 12  
big branches.



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NEW YORK  
BROOKLYN  
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*Your Gracious Host..*  
*From Coast to Coast*

In NEW YORK..



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In CHICAGO..



The Drake

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The Town House

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Belleview Biltmore

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AT  
DeWITT  
OPERATED  
HOTELS**

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**THE NEIL HOUSE**

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**BARON STEUBEN HOTEL**

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**THE SAMUELS**

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The hotels that check with every travel standard



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Automatic Over-Feed Stoker  
 Complete \$55.00 Net, Plus Freight.

### WHAT YOU GET:

- Room Thermostat
- Timer Relay
- Coal Control Motor
- Blower Motor
- Coal Spreader
- Hopper
- Burns Bailey-Rice Buck

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Available Heating Engineering Factory or Jobbing Field representative. Experienced in latest methods on all forms of heating. Address Key No. 494, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

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### FOR SALE

For Rent or Sale: Established Sheet Metal and Roofing Shop. Address Key No. 493, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

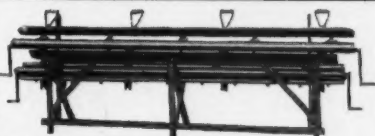
Complete set Tinners Tools in A-No. 1 condition including one 10 ft. Dreis & Krump Steel Brake; one Bertsch 36" Shear 18" open throat. Send for list. Address S. C. Lawson, Morris, Ill.

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**THOROUGHLY REBUILT**, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel. **GENERAL BLOWER CO.**, Engineers, 403 North Peoria Street, Chicago, Illinois.



### The Electric City Gutter Former

**MAKE YOUR OWN GUTTER AS YOU WANT IT**  
 Easily and quickly operated. Soon pays for itself.

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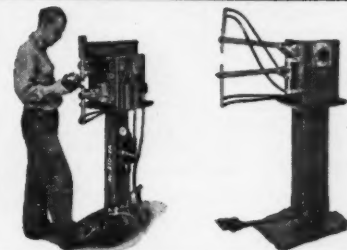
Beading Rods, Handles, Rolls, etc., quickly furnished.

#### STERLING BEADER

A simple and inexpensive machine for forming round bead.

**F. L. ROBERTSON**

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Electric welding equipment of every description to weld from a watch case to a door. Special or standard **SPOT WELDERS** from 1/4 to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

#### EISLER ENGINEERING COMPANY

CHAS. EISLER, PRES.  
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### "FRIGID" EXHAUST FANS

"Frigid" Exhaust Fans are made entirely of steel, replacing the old type cast iron frames. Four electrically welded steel supports added for rigidity. Certified ratings. Fully enclosed, dustproof. Deep hocket blade. With cord, plug and on-off switch. Sizes from 9" to 60".

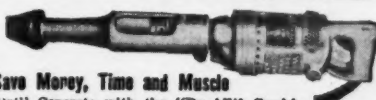
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Equipped with improved aluminum tie-rod connecting all louvers. All sizes 9" to 72".

SEND FOR ILLUSTRATED CATALOG AND LOW PRICES

Manufactured Exclusively by

**CIRCULATORS AND DEVICES MANUFACTURING CORP.**  
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**WODACK ELECTRIC TOOL CORPORATION**  
 4644 W. Huron St., Chicago, Ill.

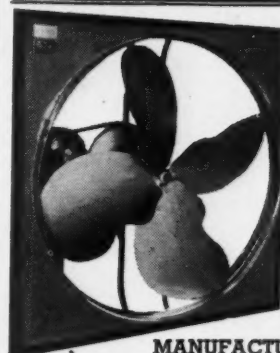
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## NEW SpeedWay 1/2" No. 89 DRILL

Full size, full weight, full capacity. Specially wound, high torque 115 V. Universal 500 r.p.m. SpeedWay Drill Motor. Forced air cooling, oilless bearings, new natural grip breast plate and removable side handles. Streamlined die cast case. If your dealer can't supply, order direct on 10 day trial.



SpeedWay Mfg. Co., 1856 S. 52nd Ave., Chicago, Ill.



#### SIZES

- 30"
- 36"
- 42"
- 48"
- 54"
- 60"

**G.E. Motors**

### ALCO

MANUFACTURING CO.

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## SPECIALLY LOW PRICED WHILE THEY LAST



### —NEW DYER JR. SPOT WELDERS IN STOCK—

- 5KW—Arms 12"
- 7 1/2 KW—Arms 16"
- 10KW—Arms 18"
- 15KW—Arms 18"
- 20KW—Arms 18"
- 25KW—Arms 24"
- 30KW—Arms 24"

If longer arms are required—add \$1.00 for each add'l. inch.

Watercooled electrodes. Floor type.

Send for free circular today!

**INTERSTATE MACHINERY CO., INC.**  
 107 S. Clinton St., Chicago



### FEATHERWEIGHT THERMOSTAT

Try out these 1 1/4-ounce Room Thermostats whenever you have trouble with "poor response," "wall influence," "inaccuracy"—You will be amazed.

Quality, modern appearance, 2 wire low voltage—list \$4.68. Liberal trade discounts.

WRITE FOR THERMOSTAT FACTS

**MAGNET SWITCH CO., 340 W. Huron St., CHICAGO**

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### STAINLESS-MONEL-COPPER, ETC.

Custom fabrication of all alloys with satisfaction guaranteed. Send blueprints for prices and delivery. Years of experience guarantee responsible and accurate work. **TERMS CASH WITH ORDER.** Write today for further information.

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**SHEET METAL PRODUCTS**  
 1528 W. 25th St., Cleveland, O.

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# She Simply Sets the Timer

GENERAL CONTROLS TURNS ON THE HEAT

## A PREVIEW OF The Beautiful New GENERAL CONTROLS All-Gas Electric\* TIMER-THERMOSTAT & REGULAR THERMOSTAT

\*Remember, No Outside  
Current Needed \*



Kay Griffith, featured  
in "Covered Wagon Days,"  
a Republic Picture

Yes, in a gas heating package set, the thermostat is what the customer sees—and beauty is their buy word.

So beauty was our by-word in the design of these new thermostats. And you'll see it amply reflected in their dull chrome cases, in their harmonizing plastic bases, in their blending vertical design, in the snug way they hug a wall. And they're beauties in more ways than one. Take the Timer-Thermostat, for instance. You simply set the timer, a 13-hour compact clock, and General Controls turns on the heat. An indicating dial shows the number of hours that will elapse before the thermostat will again come into control. At last you can give your customers the luxury of a comfortable house temperature when arising, at a cost they can afford to pay.

Either the Timer-Thermostat or the Thermometer-Thermostat, with its visible bi-metal thermometer, are now included in all General Controls B-60 Series All-Gas Package Heating Sets. Remember—these thermostats are all-electric, but no outside current is needed. For accessibility, the detachable covers simply snap on to the unbreakable plastic base plate. For versatility, the temperature range is from 50° F. to 90° F., with but 1/2° F. differential.

See and inspect these new thermostats. You be the judge. See if you don't agree they'll be one of your biggest sales builders from now on!

Request New 1940 Catalog Today



NEW TIMER  
THERMOSTAT  
T-80-8-9

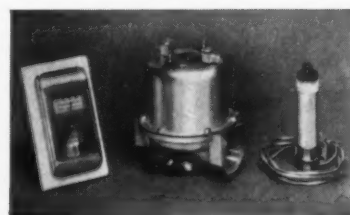


NEW THERMOMETER  
THERMOSTAT  
T-80-3-4

## FURNISHED WITH ALL GENERAL CONTROLS B-60 SERIES GAS HEATING PACKAGE SETS



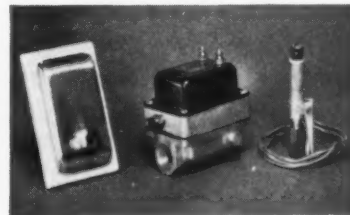
T-95 PACKAGE SET includes B-60-1 Gas  
Valve, Pilot Generator, T-80-8 Timer-Ther-  
mostat and 40 ft. of wire.



T-90 PACKAGE SET includes B-60-1 Gas  
Valve, Pilot Generator, T-80-3 Thermom-  
eter-Thermostat and 40 ft. of wire.



BX-300 PACKAGE SET includes B-60-6 Gas  
Valve, Pilot Generator, T-80-8 Timer-Ther-  
mostat, and 30 ft. of wire.



BX-210 PACKAGE SET includes B-60-6 Gas  
Valve, Pilot Generator, T-80-2 Thermostat  
and 30 ft. of wire.

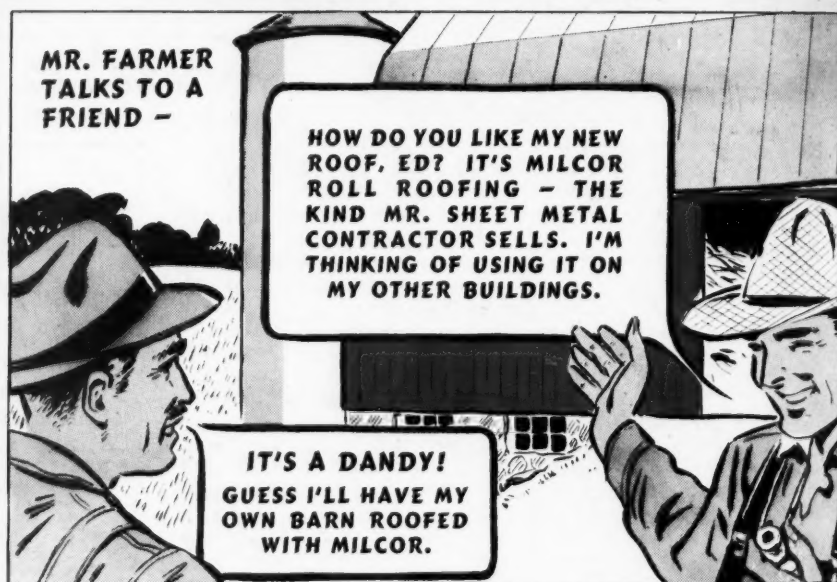
## GENERAL CONTROLS



450 East Ohio Street, Chicago, Illinois • 25 North Live Oak Street, Houston,  
Texas • 1593 Broadway, Cleveland, Ohio • 3626 Wyoming Street, Kansas  
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New York City • 700 West Ivy, Glendale, California • 6432 Cass Ave., Detroit,  
Michigan • 687 Boylston St., Boston, Mass. • Distributors in all principal cities.

# Mr. Sheet Metal Contractor finds out that **MILCOR** Roll Roofing

*keeps farm dollars coming your way*



Available in several styles and weights.

★ Show farmers how Milcor Roll Roofing provides safe, watertight protection for livestock and crops — and you get a profitable share of the farm roofing business . . . One job brings in another, because this popular roofing gives the kind of service that makes farmers glad to recommend it to others . . . You hold down labor costs, because you can lay it quickly, smoothly. It's resquared on sides and ends, notched, and fastened together with a tight, strong Double Cross Lock . . . Carried in ready-to-ship stocks at quick-delivery points . . . Build your business this season with Milcor Roll Roofing . . . Write for Milcor Price List and colorful sales helps.

G-44

**MILCOR STEEL COMPANY**

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